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BALLY MANUFACTURING CORPORATION,  
a Delaware corporation,

) Docket No.  
) 78 C 2246

Plaintiff/Counterdefendant,

VS.

D. GOTTLIEB & CO., a corporation,  
WILLIAMS ELECTRONICS, INC., a  
corporation, and ROCKWELL INTERNATIONAL  
CORPORATION,

) Chicago, Illinois  
) January 5, 1984  
) 11:15 a.m.

FILED  
OCT 30 1984

Defendants/Counterplaintiffs.

United States District Court

VOLUME III-A  
TRANSCRIPT OF PROCEEDINGS  
BEFORE THE HONORABLE JOHN F. GRADY

TRANSCRIPT ORDERED BY: MR. JEROLD B. SCHNAYER  
MR. MELVIN M. GOLDENBERG

APPEARANCES:

For the Plaintiff/  
Counterdefendant:

MR. KATZ  
MR. SCHNAYER  
MR. TONE  
MS. SIGEL

**DOCKETED**  
**NOV 08 1963**

For the Defendants/  
Counterplaintiffs:

MR. LYNCH  
MR. HARDING  
MR. GOLDENBERG  
MR. ELLIOTT  
MR. RIFKIN  
MR. ARVEY  
MR. MANUEL W. GOTTLIEB

Court Reporter:

LAURA M. BRENNAN  
219 South Dearborn Street, Room 1918  
Chicago, Illinois 60604

1 THE COURT: Good morning.

2 MR. GOLDENBERG: Good morning.

3 THE COURT: Case on trial.

4 MR. GOLDENBERG: I just wanted to introduce to the  
5 the court Mr. Manuel Gottlieb.

6 THE COURT: How do you do.

7 MR. GOLDENBERG: Mr. Gottlieb is a member of the  
8 New York Bar, and the New York firm of Golenbock and Barell,  
9 general counsel for Williams Electronics.

10 THE COURT: Pleased to meet you.

11 MR. GOTTLIEB: Thank you, your Honor.

12 MR. KATZ: Good morning, your Honor.

13 THE COURT: Mr. Katz.

14 MR. KATZ: Before we start this morning's proceedings,  
15 I'd like to move on behalf of the plaintiff to except Professor  
16 Kayton from being excluded as a witness under Rule 615.

17 And I apologize for bringing this up now. But  
18 in preparing to take the testimony of Professor Kayton as our  
19 expert witness with respect to the patent customs, practices  
20 and procedures, and particularly with respect to the reissue  
21 proceedings that have been going on in this -- that went on  
22 in this case, we realize that his presence and/or his ability  
23 to read the transcripts is essential to the plaintiff's cause,  
24 and that it falls under the third exception to Rule 615.

25 And it's essential because Professor Kayton

is going to testify to a number of matters which require him to be aware of the testimony of the other witnesses.

For example, first, all of the facts known to the inventors as well as to the plaintiff itself, that the plaintiff was legally obligated to bring before the Patent Office under the Patent Office Rule 56 to meet its duty of disclosure, are going to be an issue here.

The defendants have made more than a dozen charges of fraud and misconduct against the plaintiff. And these are facts which will be developed on direct and cross examination of the inventors, Frederiksen and Nutting, and any of the Bally witnesses as well as other witnesses.

1 THE COURT: Are we necessarily trying the question  
2 of fraud on the Patent Office simultaneously with the question  
3 of novelty and non-obviousness?

4 MR. KATZ: Yes, your Honor.

5 THE COURT: Because if it is possible to bifurcate  
6 that situation, I would like to do that.

7 MR. GOLDENBERG: I believe it is, your Honor.

8 THE COURT: Let's address that. I do not want the  
9 plaintiff putting in evidence as part of its case in chief  
10 which can as well wait until rebuttal and seems to me is more  
11 properly rebuttal in the first place.

12 MR. KATZ: But even if it is on rebuttal, your Honor,  
13 we have --

14 THE COURT: Well, all right. I know that is not  
15 what you were talking about, but it is something that occurred  
16 to me right off the bat when we started talking.

17 MR. KATZ: But we do have the same problem. It is  
18 going to be based on what our witnesses say even on cross  
19 exam, what they knew.

20 THE COURT: All right, let me hear from the defen-  
21 dants.

22 MR. KATZ: We have another reason, too, your Honor,  
23 if I can state that, and; that is, that we are concerned  
24 about --

25 Professor Kayton is going to testify with

1 respect to the effect, both positive and negative, that  
2 various evidence would have had on the decision in the reissue  
3 proceedings, had such evidence been presented to the Patent  
4 Office.

5 For example, the defendant, Williams, had had  
6 certain evidence relating to the work done by a William Guyton  
7 in Portland, Oregon, relating to some sort of pinball, and  
8 they have had it since 1980, and they have not submitted it  
9 to the Patent Office. Mr. Lynch mentioned it in his opening  
10 statement. The question is what effect under established  
11 customs and practices in the Patent Office would this have  
12 had on the Patent Office decision --

13 THE COURT: Is that an issue, Mr. Lynch?

14 MR. KATZ: -- if it had been submitted.

15 MR. LYNCH: Mr. Guyton's testimony may come in, but  
16 I do not think it is appropriate for Professor Kayton to comment  
17 on how this would have impacted what went on in the Patent  
18 Office.

19 MR. KATZ: Well, it goes to the presumption against  
20 which -- the presumption --

21 THE COURT: Why isn't that a subject of expert  
22 testimony?

23 MR. GOLDENBERG: Well, we think it goes far beyond  
24 expert testimony. It amounts to Mr. Kayton getting on the  
25 stand and a lawyer under oath and essentially making decisions

1 of at least a --

2 THE COURT: I assure you I will make the decision.

3 MR. GOLDENBERG: I do not think it would be helpful  
4 to the Court to hear that testimony, nor do I think it proper.  
5 I think it goes far beyond opinion testimony permitted by --

6 THE COURT: Well, under the rules, as you know, a  
7 witness is entitled to express an opinion on ultimate facts  
8 even if -- provided, of course, he is in an area of expert  
9 testimony to begin with.

10 It seems to me that the question of what would  
11 or would not have made a difference in the Patent Office is a  
12 subject upon which people experienced in Patent Office affairs  
13 are better informed than I am, for instance.

14 MR. LYNCH: This is whether or not the Patent Office  
15 would have regarded the invention as obvious in view of this  
16 evidence. That is the testimony, your Honor. That is the  
17 only effect we are talking about.

18 MR. KATZ: Whether or not --

19 THE COURT: Well, I think that is precisely the  
20 testimony that Professor Kayton will give. He will say, no,  
21 it was not obvious or would not have been obvious.

22 MR. LYNCH: May it please the Court, your Honor, if  
23 indeed we have the technical expert commenting on Mr. Guyton's  
24 testimony, the technical expert may comment on what  
25 Mr. Guyton says, and he may summarize it from the stand.

1 Undoubtedly, he will. Professor Kayton can listen to the  
2 technical expert.

3 If Mr. Guyton indeed comes -- he is in Oregon,  
4 and the schedule of this case is a little bit up in the air  
5 right now -- then I believe if they make an assertion that  
6 Professor Kayton has to hear Mr. Guyton's testimony, then that  
7 is another exception.

8 MR. KATZ: That was only one example, your Honor.

9 THE COURT: All right, I am going to let him stay  
10 here.

11 MR. KATZ: Okay, thank you.

12 THE COURT: The objections of the defendants are  
13 overruled. I do not know whether it makes much difference  
14 one way or the other, --

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1 MR. KATZ: Thank you, your Honor.

2 THE COURT: -- but I will let him stay.

3 MR. TONE: Your Honor, I have one matter, and I  
4 raise it now because by doing it, I hope to be able to avoid  
5 unnecessarily interrupting during the cross-examination.

6 THE COURT: Yes.

7 MR. TONE: It is a point that applies to many  
8 questions.

9 Section 112 of the patent statute provides,  
10 your Honor will undoubtedly recall, that in reading that a  
11 means plus function claim -- and all these before the Court  
12 now are means plus function claims -- are to be read as  
13 including the embodiment in the specification and all  
14 reasonable equivalents thereof.

15 It is therefore, it seems to me, irrelevant  
16 that a particular matter is not found in the claim. There  
17 are a number of questions, reading over the transcript,  
18 that really ask the witness to interpret the claim. In  
19 substance they ask the witness to interpret the claim, and  
20 yet the specification is not before the witness -- and I,  
21 by the way, ask that the witness be excluded from the  
22 courtroom while I present this. Needless to say, it has  
23 not been discussed with him.

24 The witness is asked whether a certain -- I  
25 have no objection to asking him whether a word is in the



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1 claim.

2 "Is the word 'matrix' in the claim?"

3 Of course it isn't, but when you ask him  
4 does the claim mean this, in order to answer the question  
5 properly -- and it is a matter of law; the Court is to  
6 construe the claim -- he would have to look at the speci-  
7 fication, the embodiment, consider what reasonable equi-  
8 valents there are, and so on. That is a legal question.

9 It would be difficult to make that objection,  
10 it seemed to me, or at least that objection can better be  
11 explained in a motion in limine, and that is why I do it  
12 that way.

13 I am really asking the Court to set as a  
14 ground rule that the witness should not be asked to inter-  
15 pret claims.

16 THE COURT: All right, Mr. Lynch, let me hear from  
17 you.

18 MR. LYNCH: I don't believe I did, your Honor,  
19 but I do think I am entitled to ask the witness the technical  
20 meaning of what is recited in the claim.

21 THE COURT: What about the effect of Section 112?

22 MR. LYNCH: The effect of Section 112, your Honor,  
23 must be interpreted in light of all the law. When there is  
24 a claim that has "matrix" in it, perforce, under the doctrine  
25 of claim differentiation, the claim that does not recite

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1 "matrix" has to be broadened. It has to include as a  
2 matter of law, I believe, your Honor, the possibility that  
3 a matrix not exist in that original claim.

4           You recall we had Claim 45 that said multi-  
5 plexing means and Claim 46 that said a matrix. One of the  
6 things that I believe is appropriate for briefing and I  
7 didn't bring up with the witness is the idea that when you  
8 have a structure of that nature, your Honor, and Claim 45  
9 does not mention matrix, Claim 46 comes along and does  
10 mention matrix, then perforce the Claim 45 must be broad  
11 enough to include an arrangement that does not involve a  
12 matrix.

13           I think that the testimony of the witness  
14 established that multiplexing can be carried out without  
15 using a matrix, and that I think was the point of the testi-  
16 mony.

17           THE COURT: Does anybody have a copy of Section  
18 112?

19           MR. LYNCH: Certainly, your Honor.

20           MR. TONE: We have sent for it, your Honor.

21           May I only say, while we are waiting --

22           THE COURT: I can pull it off my shelf.

23           MR. GOLDENBERG: Here it is, your Honor.

24           MR. LYNCH: Here it is.

25           MR. TONE: I would only say at this point that

1 what Mr. Lynch says further illustrates my point that this  
2 is a legal question, with which we shouldn't be taxing the  
3 witness.

4 MR. KATZ: Your Honor, for example, in that claim  
5 that Mr. Lynch refers to about the matrix and Claim 46, it  
6 also talks about another thing called sets of elements.  
7 The only reason that "matrix" is in there is so it defines  
8 what sets of elements are.

9 So then it is not possible to use the theory  
10 that Mr. Lynch said because the question is should it be  
11 interpreted, should that theory apply where it may or may  
12 not -- whether matrix is the only thing in the claim,  
13 you can't necessarily draw the conclusion that --

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1 THE COURT: Excuse me just a minute, Mr. Katz. I  
2 can't listen to you and read this at the same time.

3 (Brief interruption.)

4 THE COURT: I haven't looked at the specifications.  
5 Do the specifications describe in each instance a matrix?

6 MR. LYNCH: The specification does describe a matrix,  
7 your Honor, yes --

8 THE COURT: Can you read the specifications so as  
9 not to include a matrix?

10 MR. LYNCH: Your Honor, if the specification is  
11 read to include a matrix, a single matrix, we don't infringe.

12 MR. SCHNAYER: It does not --

13 THE COURT: Well, that's a second --

14 MR. LYNCH: I understand. But your Honor --

15 THE COURT: What's the answer to the first question?

16 MR. GOLDENBERG: The answer to your question is,  
17 yes. The specification includes a matrix. Indeed, that is  
18 the thrust of the specification.

19 THE COURT: All right. Well, the language of the  
20 last paragraph of Section 112 seems clearly to support  
21 Mr. Tone's argument.

22 I haven't read any cases under that --

23 MR. LYNCH: I have one, your Honor, right here.

24 This is a, really a complex issue. "Applica-  
25 tion of Lundberg," I can hold it up for your Honor.

2  
1 There are two issues, your Honor. There's an  
2 infringement issue and a validity issue: How do you construe  
3 a claim for validity purposes, how do you construe it for  
4 infringement purposes.

5 The law is that the statement that you are  
6 reading in 112 is an infringement statement. That's how you  
7 determine infringement.

8 If it says "means," you say: "What does the  
9 applicant mean by the term means."

10 You must go to the specification and take  
11 equivalents to that.

12 With respect to validity, however, the case,  
13 for example, "Application of Lundberg," 244 F. 2d 543 at 547,  
14 indicates that the construction that Mr. Tone is seeking to  
15 put on Section 112 for purposes of validity is untenable.

16 I can hand it up --

17 THE COURT: Why should it make any difference  
18 whether you're talking about infringement or validity?

19 MR. LYNCH: The point is, your Honor, that when a  
20 claim does not say matrix, for purposes of looking at prior  
21 art you cannot assume that there's a matrix in it.

22 When you look at it for purposes of infringe-  
23 ment, then you refer to that paragraph of 112.

24 THE COURT: I understand what you're saying. But  
25 my question is, what's the rationale for the distinction?

1           Maybe I should look at the case.

2           MR. LYNCH; Okay.

3           MR. GOLDENBERG: The rationale --

4           MR. KATZ: Your Honor, I think you'll find, when you  
5 look at the case, that that would only apply during the pendency  
6 of the case at most, not after it's issued as a patent. Because  
7 otherwise, if the claim doesn't have the same meaning for  
8 validity and infringement, and you use two different standards,  
9 you're really going to cheat the inventor.

10          THE COURT: Well, are there cases on this, other  
11 than the Lundberg case?

12          MR. GOLDENBERG: Indeed.

13          MR. HARDING: There are, your Honor.

14          THE COURT: Sounds to me like it's something I should  
15 have a memorandum on.

16          MR. GOLDENBERG: I think so, Judge.

17          THE COURT: Why don't you -- now, I take it that  
18 for immediate purposes we've pretty well finished with this  
19 particular point anyway, I mean, whether matrix is mentioned  
20 in the claims or not.

21          MR. LYNCH: That's exactly right, your Honor.

22          MR. TONE: I couldn't tell from --

23          THE COURT: Well, we have a continuing concern about  
24 what the effect of that is. So why don't you file, at your  
25 convenience, file some cross memoranda on that.

1 MR. GOLDENBERG: Your Honor, I would like you to have  
2 in mind that the witness has read the specification. He is  
3 one of the inventors. And, indeed, he signed a declaration  
4 or an affidavit submitting -- submitted to the Patent Office  
5 that: I have read the attached specification and I am the  
6 first and only inventor.

7 So there can be no question on that issue of  
8 this witness' knowledge of the specification and what it said.

9 THE COURT: Well, but he hasn't been asked whether  
10 the specification includes a --

11 MR. GOLDENBERG: No, no.

12 MR. TONE: That's right.

13 MR. GOLDENBERG: But their basis for coming at you  
14 on this matter is that the -- saying that there was no  
15 showing that he was familiar with the specification.

16 All he was asked to do was to say did the  
17 claim --

18 THE COURT: I don't think that's their point.

19 MR. TONE: That isn't the point.

20 MR. LYNCH: Your Honor, my whole question is to  
21 bring up to the Court, as I can in evidence, the fact that  
22 the claims do not contain the word matrix.

23 THE COURT: That's all right. It's not mentioned  
24 in there. And I think that there is some logic to Mr. Lynch's  
25 point that, notwithstanding 112, if you mention matrix in one

claim and don't in another, you must be attempting to achieve something by that omission or by that distinction.

And it seems to me that the purpose --

MR. LYNCH: There are cases on that, too.

THE COURT: -- may well be a broader claim.

So my curbstone opinion is that the rule that the plaintiff is contending for is the general rule; but nonetheless, where there are differential claims, some mentioning and some not mentioning the structure found in the specifications, that the structure that doesn't mention it, since you have to read it as having some independent significance, must comprehend a device without that structure.

Now, that's my curbstone opinion, which I won't charge you for at this point. And I'll wait to see what your memoranda reveal on what the law is.

MR. TONE: All right. And my only point was that, to ask the witness whether something is in a claim, when he's looking only at the claim --

THE COURT: I understand what is meant by claim is the piece of paper that says claim there. And that the question didn't refer to the specification.

MR. LYNCH: I was not attempting, your Honor, to have the witness indicate in that whether -- well, your Honor understands what I was doing.

THE COURT: All right.



MR. TONE: I think we understand the matter.

THE COURT: Okay.

MR. TONE: Thank you, your Honor.

Please bring the witness back.

JEFFREY E. FREDERIKSEN, PLAINTIFF'S WITNESS, PREVIOUSLY SWORN.

CROSS EXAMINATION (Continued)

THE COURT: Oh, I'm sorry. I didn't think you were here.

Good morning.

THE WITNESS: Good morning, your Honor.

THE COURT: Go ahead.

BY MR. LYNCH:

Q Mr. Frederiksen, yesterday when we concluded the examination we were speaking about the displays on the Flicker machine, correct?

A Yes.

Q Those displays, what size are they?

A They're half-inch.

Q At some time did the Flicker machine have other displays on it?

A Yes, I believe so.

Q They were expanded, were they not?

A Yes.

Q And then they were put back in this condition for this trial. Is that correct?

1 A No.

2 Q When were they put back in this condition with the half-  
3 inch displays?

4 A Shortly after we tried the expanded experiment, we put  
5 the machine back into its original operational state. And it  
6 remained that way for virtually the rest of its life, until  
7 we were instructed to shut it down.

Frederiksen - cross

1 Q But these displays are half-inch LED displays, correct?

2 A Yes.

3 Q Now, I place before you, Mr. Frederiksen, a copy of  
4 Exhibit I-10, a manual entitled, "Fairchild Semiconductor  
5 Manual."

6 (Brief interruption.)

7 MR. TONE: What exhibit?

8 MR. LYNCH: I-1 or 1-I. I am sorry.

9 BY MR. LYNCH:

10 Q Have you ever seen that device before-- that booklet  
11 before -- Mr. Frederiksen?

12 A If it would be all right, could I take a look at the  
13 original?

14 THE COURT: Do you want to look at the book? Sure.

15 MR. LYNCH: I think, your Honor, if your Honor does  
16 not mind, perhaps if your Honor would use the copy.

17 THE COURT: Sure.

18 MR. LYNCH: It has only the relevant pages repro-  
19 duced.

20 THE COURT: Fine.

21 (Brief interruption.)

22 BY MR. LYNCH:

23 Q Are you familiar with that particular manual,  
24 Mr. Frederiksen?

25 A Yes.

Q Did you have a manual of this type available to you in 1974 when you were designing the Flicker?

A I believe so.

Q You had that available to you when you were designing Super IQ Computer as well, correct?

A Yes, this is correct, although I did not use this manual in conjunction with those two projects. I used it in conjunction with the Safe project.

Q You had this available to you at the time, and you used it in connection with the Safe project that was completed earlier, is that correct?

A That is correct.

Q I would like you to refer to --

THE COURT: I am sorry. What was the name of that project?

MR. LYNCH: Safe.

THE COURT: S-a-f-e?

MR. LYNCH: Yes, the Safe Game, your Honor, cracking the safe.

THE COURT: Oh.

MR. LYNCH: It was a TTL game that the witness testified about, I believe, in his direct.

BY MR. LYNCH:

Q I would like to refer you, Mr. Frederiksen, to page 3-8 of Exhibit 1-I, the Fairchild manual.

Frederiksen - cross

1 Now, on that page is described multiplexing of  
2 displays such as the LED displays in Exhibit 333, the Flicker,  
3 correct?

4 MR. TONE: May I have the question read? I missed  
5 one word.

6 THE COURT: Yes.

7 Q (Read by the reporter.)

8 BY THE WITNESS:

9 A Yes, that is correct.

10 BY MR. LYNCH:

11 Q Now, I would like to refer you, Mr. Frederiksen, if I  
12 may, to the first full paragraph in the right-hand column of  
13 page 3-8, the paragraph that begins, quote:

14 "Multiplexing a small number of displays is  
15 not economical unless the data input is in serial  
16 form. Multiplexing can offer advantages after about  
17 four digits for some display types."

18 Did you have more than four digits you were  
19 dealing with in the Flicker, Mr. Frederiksen?

20 A Yes.

21 Q Did you have more than four digits to deal with when you  
22 were doing Super IQ Computer?

23 A Yes.

24 Q Now, it goes on to say:

25 "The maximum number of digits is about 12

1 except with LED displays."

2 Did you have less than 12 digits in both of  
3 those devices?

4 A. No.

5 Q. But in each multiplexed area, did you have less than 12?

6 A. No.

7 Q. Where did you have more than 12 digits, Mr. Frederiksen?

8 A. As pointed to in the patent, there were 16 digits  
9 multiplexed in conjunction with the Flicker.

10 Q. Fine.

11 Now, you used a LED display on that?

12 A. That is correct.

13 Q. Now, beyond this number, it becomes difficult to power  
14 each display for its diminishing share of time.

15 The remainder of this paragraph, does it address  
16 the same problem of the flicker of the display, if you cannot  
17 get enough power to it and power sufficiently frequently?

18 A. I don't know. I would have to have some time to read  
19 this.

20 If I could take a second?

21 Q. Please do.

22 (Brief interruption.)

23

24

25

1 BY THE WITNESS:

2 A. Could you repeat the question, please?

3 BY MR. LYNCH:

4 Q. The remainder of this paragraph does address the situation  
5 of flicker which can result with a multiplexed display if you  
6 do not power it frequently enough, isn't that correct?

7 A. I don't believe so.

8 Q. Well, it indicates:

9 "For a given brightness, the display will  
10 require a given power whether or not it is multi-  
11 plexed. When multiplexed this power is supplied  
12 to the display in pulses for a fraction of a complete  
13 scan cycle."

14 Isn't that what you did on the Flicker?

15 A. Yes.

16 Q. "Hence voltage and/or current must be increased  
17 over that required for the DC conditions."

18 Isn't that what you testified you had to do,  
19 supply more current for only a portion of the cycle?

20 A. Yes.

21 Q. Now, in the last sentence it says:

22 "Multiplexing incandescent displays is less  
23 attractive because each filament of the display  
24 requires a diode to stop sneak electrical paths."

25 Now, your lamp displays were incandescent

1 displays, correct?

2 A Yes.

3 Q You had to put those diodes in the matrix, did you not?

4 A Yes.

5 Q That was to avoid these sneak electrical paths, correct,  
6 at least?

7 A Yes.

8 Q Now I would like to show you, and it is the case, is it  
9 not, that the displays that you addressed in the Flicker were  
10 LED displays, correct?

11 A Yes.

12 Q Not incandescent?

13 A Correct.

14 Q The patent addresses also in a number of places but  
15 specifically as a concise recitation of what the patent recites,  
16 refer to Claim 10.

17 Without going to the scope of the claim, can  
18 you tell me technically, Mr. Frederiksen, what is recited in  
19 Claim 10?

20 MR. TONE: I object to that, your Honor, if he is  
21 asking the witness to interpret the claim.

22 MR. LYNCH: I am not.

23 MR. TONE: If he is merely asking him to read it,  
24 no objection.

25 BY MR. LYNCH:



Frederiksen - cross

Q Just from a technical aspect, what is the technical recitation that appears in Claim 10?

A Claim 10 does refer to Claim 9, which --

Q I understand that.

A -- refers to Claim 8.

Q I understand. I just want the particular aspect of what you did that is addressed in Claim 10.

THE COURT: In other words, what does Claim 10 add to the other claim or subtract, if that is the case?

(Brief interruption.)

THE COURT: To save time, would you want to lead him and see whether he agrees with you?

BY MR. LYNCH:

Q Well, Claim 10 just provides, does it not, that when you have a display activation for lamps, that what you should do is use a voltage which is higher by approximately the amount equal to the product of the voltage rating of the lamp and the square root of the number of sets of display activation elements, correct?

MR. TONE: Excuse me --

BY THE WITNESS:

A Correct.

MR. TONE: -- your Honor. Well, he has answered the question before I could object.

THE COURT: What was the answer? I didn't hear.

Was it no?

THE REPORTER: "Correct."

THE WITNESS: I said that is correct.

Frederiksen - cross

1 MR. TONE: All right, the answer is in. My objec-  
2 tion was that that really does ask him to interpret the  
3 claim.

4 THE COURT: Why can't he interpret the claim?  
5 He is the inventor, or one of the inventors.

6 MR. TONE: I think the interpretation of the claim,  
7 your Honor, is a legal question, and it has to be done in  
8 light of the last sentence of Section 112.

9 THE COURT: I think that interpreting the claim is  
10 very often a matter of explaining technical language, and at  
11 this point of the trial at least I regard this witness as  
12 far better able to interpret these claims than I am.

13 For instance, I don't see any legal questions  
14 here yet. Half these words in here I don't know what they  
15 mean. He knows what they mean.

16 MR. TONE: Well, except that the specification  
17 defines the terms in the claim.

18 THE COURT: Well, that is a point that I have in  
19 mind, but I don't think that it is a basis for an objection  
20 to a particular question.

21 Go ahead. Proceed.

22 BY MR. LYNCH:

23 Q My question is simple, Mr. Frederiksen. Refer to page  
24 313 of the manual you have before you, Exhibit 1-I.

25 Down at the bottom, at the top of the right

CD

Frederiksen - cross

1 hand column of the text, they give a formula on how to deter-  
2 mine the multiplexed voltage, and doesn't that formula  
3 essentially conform to what you recite in Claim 10?

4 A. Yes.

5 Q. That was the only question.

6 Now, yesterday, Mr. Frederiksen, you under-  
7 took to do an exhibit of the switch matrix, the numeral  
8 matrix, and the row lamp matrix.

9 Could I have that exhibit, please? There  
10 was a sketch --

11 MR. TONE: John, let's go off the record.

12 (Brief interruption.)

13 MR. LYNCH: Well, your Honor, apparently it has  
14 been given to the clerk.

15 BY MR. LYNCH:

16 Q. I will start all over, Mr. Frederiksen.

17 I believe that yesterday when you created  
18 that diagram, you showed seven rows that went to the numeral  
19 displays at the top. Do you recall?

20 A. Yes.

21 Q. I think you called these the digits.

22 A. Yes.

23 Q. Under that I believe you had the switches, is that  
24 correct?

25 A. Yes.

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1 Q. There are four rows of switches?

2 A. Yes.

3 Q. Below that yet you had four rows of what I believe you  
4 called row lamps, correct?

5 A. Yes.

6 Q. You indicated that in the Flicker game, and indeed, it  
7 was true in the IQ Computer, was it not, that you ran your  
8 columns all the way through the matrix, correct?

9 A. Yes.

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Frederiksen - cross

1 Q In the Flicker game you had columns A through F, which  
2 really, can I say columns 1 through 16?

3 A Yes.

4 Q That placed the entire digit, switch, and lamp amounts  
5 in what is called a matrix. Now, that is an electrical  
6 matrix, correct?

7 A Yes.

8 Q In other words, the devices are where they are on the  
9 playfield and you would bring the wires to them so you would  
10 connect them in this fashion?

11 A Yes.

12 Q If I could use an example, if we were to construct  
13 this matrix out of rubber bands and it was stretchable,  
14 you could take them and put the crosspoint at each of the  
15 lamps and each of the displays and each of the switches, if  
16 you could do that by stretching it, you would have what the  
17 wiring diagram would more or less look like?

18 A Yes.

19 Q In that context everything was in a single matrix, and  
20 you indicated that you had time constraints imposed upon you  
21 for that reason, correct, Mr. Frederiksen?

22 A I don't believe so.

23 Q Well, let me say this. In order to keep a lamp from  
24 flickering, a lamp at a location that I will mark in red  
25 (indicating), in order to keep that from flickering, this

1 column 1 had to be activated at least 60 times a second or  
2 100 times a second, correct?

3 A. Yes.

4 Q. Because if you start activating it only 15 times a  
5 second, you will see the lamp flicker, as in your demon-  
6 stration model that you showed the Court, right?

7 A. Yes.

8 Q. Also if you had a switch, which I will illustrate in  
9 red up in row 2, just schematically as a switch (indicating),  
10 you also had to come back to that every so often, correct?

11 A. Yes.

12 Q. Similarly you would have to activate each column in  
13 the digits every so often to prevent flicker there, correct?

14 A. Yes.

15 Q. So what you had as a constraint was you had to accommo-  
16 date the situation in all three circumstances, correct?

17 A. Right.

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1 Q And do the processing in between that was necessary.

2 A Right.

3 Q Now, isn't that a constraint which is imposed by the fact  
4 that everything is in a single matrix?

5 A No.

6 Q Well, if you, Mr. Frederiksen, were to have placed the  
7 digits -- couldn't the digits have been in their own matrix?

8 A Yes.

9 Q 1 to 16?

10 A Yes.

11 Q And you could have put the switches in their own matrix  
12 as well, correct?

13 A Right.

14 Q And you could have put the lamps in their own matrix,  
15 correct?

16 A Right.

17 THE COURT: Mr. Lynch, does the question of one or  
18 multiple matrices go to validity?

19 MR. LYNCH: I think it goes to both, your Honor,  
20 perhaps.

21 THE COURT: All right. Well, as long as it goes  
22 to the validity, we're in the right part of the case, even  
23 if it goes to infringement. But if it's just infringement,  
24 then I wanted to postpone it.

25 MR. LYNCH: Your Honor, that we wouldn't understand.



bRJ

Frederiksen - cross

1 We are trying both things here, aren't we, both validity and  
2 infringement?

3 MR. TONE: At least my understanding was the same.

4 THE COURT: Now, I was told that you couldn't bi-  
5 furcate the two, that's right.

6 This is the first case I've ever been told  
7 that. But I went along with you.

8 MR. TONE: I think that probably the reason, your  
9 Honor, is that there is a rule, or there used to be a rule  
10 that both issues should be decided in case the reviewing  
11 court disagrees on one issue, and then it will have the  
12 other one, the other decision before it.

13 But our understanding has also been, and we  
14 are preparing to present the evidence on infringement.

15 THE COURT: Well, if there is a validity question  
16 substantial enough to warrant a trial -- and I'm presuming  
17 there is an issue that substantial -- and if the infringe-  
18 ment issues involve a significant amount of additional time --  
19 which I also assume to be true -- it seems to me that a  
20 patent case where you have issues of validity and infringe-  
21 ment present the classic situation for bifurcation; in the  
22 interest of judicial economy.

23 Now, I guess the reason I acquiesced in not  
24 doing it that way -- which I'd forgotten I had -- was that  
25 you told me that, as a practical matter, they're all wrapped

1 together here. And you can't separate them.

2 If that's the situation, then I'm stuck. But  
3 if it isn't the situation, I'd like to re-order the thing in  
4 such a way that we can go step 1, step 2, step 3.

5 MR. GOLDENBERG: Your Honor, if I may. I think  
6 that you could see that they are wrapped up together --

7 THE COURT: All right. If you still think that  
8 way, I'm not going to try to overrule you on it.

9 MR. GOLDENBERG: The point would be that the paten-  
10 tee on one hand shouldn't be permitted to give a narrow  
11 scope of his patent in order to preserve its validity, and  
12 then assert a broad scope with respect to its claims and  
13 so forth in order to -- infringement.

14 And trying them both together, I think you  
15 minimize the opportunity of that kind of result occurring.

16 THE COURT: And maybe I should correct something  
17 I said.

18 I can't remember -- well, I know one case I  
19 tried, I think it was the last patent case I did try, we  
20 tried validity only, and that ended the case.

21 But I think in the other ones I've tried  
22 I probably did try both validity and infringement. It  
23 was damages that we --

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1 MR. LYNCH: Damages had been severed, your Honor.

2 MR. GOLDENBERG: It had been severed.

3 THE COURT: Severed, and, of course, you can always  
4 do that.

5 All right, I am satisfied.

6 BY MR. LYNCH:

7 Q Now, Mr. Frederiksen, when the entire matrix is set up,  
8 there is down on this column drive that would have driven the  
9 entire matrix of Flicker or IQ Computer, IQ Computer being a  
10 somewhat smaller matrix.

11 There was a decoder, correct? I am just going  
12 to call it DC down here.

13 A Yes.

14 Q In the case of Flicker, for example, that is called a  
15 one-in-sixteen decoder, correct?

16 A Yes.

17 Q Now, essentially, what happens is that decoder received  
18 a signal, isn't that correct?

19 A Yes.

20 Q That signal causes the strobe to occur?

21 A Essentially, that is correct.

22 Q Now, the strobes operate from this decoder depending  
23 upon the software in the system. You could activate that  
24 decoder in more than one fashion, isn't that correct?

25 A Yes.

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1 Q Now, if separate decoders were placed on the digit and  
2 they were placed in a separate matrix, and a separate decoder  
3 placed on the switches and they were placed in a separate  
4 matrix; under those circumstances, Mr. Frederiksen, one would  
5 have to have a decoder on the two lines coming into the switch  
6 matrix and a decoder coming into the digit matrix, correct?

7 A Yes.

8 Q Those would be extra parts, correct?

9 A Yes.

10 Q You save those parts by using one decoder in a single  
11 matrix?

12 A Yes.

13 Q Now, I am going to put an orange DC here for the switch  
14 matrix and a blue one for the digit matrix. Indeed, I am  
15 going to come down, and if we were to put the lamps in a  
16 separate matrix, we would have to have a separate decoder  
17 there as well, correct?

18 A Correct.

19 Q Now, under such a situation, Mr. Frederiksen, is it not  
20 the case that you could in your device set up the strobe rates  
21 then for each of the matrices?

22 A Yes.

23 Q You could set them up as different strobe rates, could  
24 you not?

25 A Yes.

Frederiksen - cross

1 Q If you could set them up at different strobe rates, you  
2 could accommodate the necessities of the digits with your  
3 digit strobe rate, correct?

4 A Yes.

5 Q And the switches with your switch strobe rate, correct?

6 A Yes.

7 Q And the lamps with your lamp strobe rate?

8 A Yes.

9 Q How large was the -- how much memory space was utilized  
10 in the Flicker program?

11 A To the best of my recollection, it was less than 1,000  
12 instructions.

13 Q I think in your patent or in the -- I am sorry -- in  
14 your program listing, there is an indication of 869 instruc-  
15 tions approximately.

16 Is that consistent with your memory?

17 A I recall it being in that area.

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- 1 Q. How much memory did you have available to yourself?
- 2 A. We originally had a thousand instruction availability.
- 3 Q. 1,024 instructions?
- 4 A. We could have gone more.
- 5 Q. Now, it is the case, is it not, Mr. Frederiksen, that
- 6 when one utilizes three separate matrices, one must use
- 7 more memory space, isn't that correct?
- 8 A. There would be a slight amount more.
- 9 Q. I now place before you, Mr. Frederiksen, a copy of
- 10 Defendants' Exhibit 1-A.
- 11 Can you identify what is Exhibit 1-A, Mr.
- 12 Frederiksen?
- 13 A. It is the Intel MCS 4 user's manual.
- 14 Q. Now, this device was available to anyone who wished
- 15 to use the 4004 microprocessor, correct?
- 16 A. Yes.
- 17 Q. It became available, it indicates, in February of 1973,
- 18 is that correct?
- 19 A. That is the publishing date.
- 20 Q. Did you have a manual of this type available to you
- 21 when you did the work on IQ Computer and the work on Flicker?
- 22 A. I believe it was this manual.
- 23 Q. It was this very manual, is that correct?
- 24 A. I believe so.
- 25 Q. You referred to this manual, did you not?

bLB

Frederiksen - cross

1 A Yes.

2 Q You used this manual in order to ascertain the 4004  
3 microprocessor could be operated, correct?

4 A Yes.

5 Q Prior to the time of reading this manual, you did not  
6 have any information on that except what you got orally  
7 from the salesman, is that correct?

8 A I don't recall explicitly what he left with me, but  
9 essentially that is true.

10 Q Now, I would like you to refer to Page 51 of the  
11 manual, Mr. Frederiksen.

12 THE COURT: Page what?

13 MR. LYNCH: 51, your Honor.

14 BY MR. LYNCH:

15 Q Now, Page 51 indicates that the MCS 4 computer systems  
16 are often used to replace random logic controllers in a  
17 wide variety of systems, correct?

18 A Yes.

19 MR. LYNCH: I have for the Court's convenience,  
20 your Honor, a blown-up version of Page 51 of the manual,  
21 so we can all look at it.

22 BY MR. LYNCH:

23 Q In each of these systems, it goes on to say:

24 "A number of peripheral devices such as  
25 keyboards, switches, indicator lamps, numeral

1 controls, printer mechanisms, relays, solenoids,  
2 et cetera, may have to be interrogated or con-  
3 trolled."

4 Now, what you were confronted with with IQ  
5 Computer and with Flicker was a situation where you had to  
6 interrogate or control switches, indicator lamps, numeral  
7 displays, perhaps some relays and solenoids, isn't that  
8 correct?

9 A. Yes.

10 Q. The indication here is that the user or the engineer  
11 should take the following steps, and it indicates in the  
12 paragraph marked number 1:

13 "When the number of input lines is insuffi-  
14 cient, multiplexers must be added," correct?

15 A. Yes.

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1 Q Now, when you found, when you initially encountered the  
2 4004 microprocessor, did you not ascertain that multiplexing  
3 was one of the recommended fashions of getting information  
4 to the microprocessor unit itself?

5 A If by multiplexing you're referring to any multiplexing  
6 technique, not specifically time division multiplexing, yes.

7 Q There's time division multiplexing and frequency multi-  
8 plexing, correct?

9 A The multiplexers here, I believe, are referring to hard-  
10 ware multiplexer chips. These are, for example, a TTL element.

11 Q It says "multiplexers must be added."

12 A Yes. Not multiplexing. It says multiplexers, referring  
13 to a part, I would assume.

14 Q I see. Now, but it does indicate that the device was  
15 indeed intended to control precisely, interrogate and control  
16 precisely the same kind of units that you were confronted  
17 with controlling and interrogating. Correct?

18 A I'm a little confused by what you mean by precisely, and  
19 the type of unit.

20 Q Well, you were going to control switches, interrogate  
21 switches, correct?

22 A Right. But not necessarily precisely the type of  
23 switches they're referring to.

24 Q Ah. I understand.

25 You are saying there's something unique about

## Frederiksen - cross

1 pinball switches, correct?

2 A. Most definitely.

3 Q. But they are switches nonetheless.

4 A. In a very general sense, yes.

5 Q. Solenoid, you did have solenoids.

6 A. Yes.

7 Q. A unique type of solenoid?

8 A. Compared to my prior experience they were unique in  
9 their very high amount of power. Other than that, generally  
10 solenoids.

11 Q. How about the indicator lamps, were they unique?

12 A. I don't believe so.

13 Q. How about the numeral displays, anything unique about  
14 the numeral displays?

15 A. No.

16 Q. Now, you also indicated that random logic or transistor-  
17 transistor logic was a way that you considered prior to going  
18 to the microprocessor. Correct?

19 A. Yes.

20 Q. And this indicates that the MCS4 systems are often used  
21 to replace random logic control.

22 Is that not the case that you found, that the  
23 microprocessor, the MCS4, was designed to replace TTL logic  
24 in many -- in a wide variety of systems?

25 A. Yes. TTL random logic.

Frederiksen - cross

Q Or electromechanical logic. Correct?

A. Yes.

Q And what you found in the pinball machine was random electromechanical logic. Correct?

A. Correct.

Q Going on to the next page, page 52, of the Intel manual, there's further information discussed.

THE COURT: Excuse me. Could I have you tell me again what random logic means?

THE WITNESS: Your Honor, there's two kinds of things that you can do: You can have something like a computer that is intelligent, and you can go around and look at all the different things that you want sampled; or you can have a specific piece of hardware attached to each one of those things permanently, so it's always looking at those things.

Such as, one switch or a series of switches may have one control piece of hardware built specifically for that; whereas, if you would use a microprocessor for that, you might use it for that group of switches but you would also timeshare it with other functions as well for electronic economy.

And the price you pay there is that, in time-sharing you may -- you have to be careful to get back to each function often enough.

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THE COURT: The random logic is the permanent  
setup?

THE WITNESS: Yes, fixed logic for each function.

THE COURT: Fixed logic, so random means fixed in  
that sense?

THE WITNESS: Yes.

THE COURT: Or at least in that illustration.

BY MR. LYNCH: . . .

Q Perhaps one small illustration.

On an electromechanical keyboard, on an  
electromechanical playfield, when you push a button, a  
certain number of lights will light, correct?

A. Yes.

Q And a certain score will appear?

A. Yes.

Q That will appear because, to use a rough analogy,  
there are wires connecting that very switch to cams or  
something that make that one function occur, correct?

A. Yes.

Q When you have a microprocessor and you trip the  
switch, the signal that that switch has tripped goes back  
to the microprocessor and then the microprocessor responds  
by doing the scoring or lamp lighting that you desire,  
correct?

A. Yes.

cbCD

Frederiksen - cross

1 Q You indicated yesterday that whereas random logic is  
2 fixed, once you design this game, you have to begin all  
3 over with the other game, correct?

4 A Yes.

5 Q Whereas when you have a microprocessor, you can change  
6 the instruction. You can tell the microprocessor, "Well,  
7 in this game let's make it 50 points instead of 100 points  
8 for hitting that switch," correct?

9 In the next game, in the next game design.

10 A Yes.

11 Q That is the operation of the microprocessor; the opera-  
12 tion is such that switch tripping goes back to the micro-  
13 processor, is processed, and then the microprocessor tells  
14 the other elements how to perform, correct?

15 A Yes.

16 Q Now with respect to the continuation on the Intel  
17 manual, on the next page there is discussion about a key-  
18 board.

19 What is one of the principal uses that  
20 microprocessors were found in in 1973?

21 A Calculators, I believe.

22 Q Cash registers also?

23 A I don't know from personal experience.

24 Q Calculators, and how does one input information to a  
25 calculator?

1 A. Through a keyboard.

2 Q. So a keyboard refers to the keys on the calculator,  
3 correct?

4 A. Yes.

5 Q. How did the MCS-4 manual tell you how to arrange the  
6 keys on a calculator?

7 How does it tell --

8 A. The keyboard is arranged as an n by m matrix of key  
9 switches.

10 Q. It is illustrated also in Figure 13, isn't that  
11 correct, switches arranged in a matrix?

12 A. Yes.

13 Q. Behind each of the keys on the keyboard of a calculator  
14 is the switch, isn't that correct?

15 A. Yes.

16 Q. When you hit it, there has to be a detection of that  
17 switch, correct?

18 A. Yes.

19 Q. In this matrix arrangement, was it not standard to  
20 multiplex such an arrangement?

21 A. Yes.

22 Q. The switches then would have their closures sensed,  
23 according to the disclosure of the Intel manual, by a  
24 multiplexing arrangement, correct?

25 A. Yes.

1cbCD

Frederiksen - cross

1 Q. So it was a matrix multiplexing of switches, correct?

2 A. Yes.

3 Q. Continuing, Mr. Frederiksen, to the next page of the  
4 Intel manual -- well, and indeed, in these arrangements in  
5 these matrices, it was standard to do the multiplexing in  
6 a cyclical fashion, isn't that correct?

7 A. Yes.

8 Q. And to do it in a cyclic and sequential fashion, isn't  
9 that correct?

10 A. Again I don't know from personal experience, but I  
11 would assume so.

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1 Q The switches in a microprocessor controlled calculator  
2 are activated in order to activate a display, isn't that  
3 correct?

4 A Yes.

5 Q The display displays the numbers you punch in, correct?

6 A Yes.

7 Q On page 53 there is a discussion of displays that can be  
8 controlled with the 4004 microprocessor, correct?

9 A Yes.

10 Q It indicates that, "displays such as NIXIE tubes and  
11 LED arrays are easily interfaced with the MCS-4 system," correct?

12 A Yes.

13 Q "These displays may be DC driven or multiplexed," correct?

14 A Yes.

15 Q It says, "In the multiplexed mode a number of display  
16 devices are activated at one time in rapid sequence. For  
17 sufficiently rapid scanning, the eye accepts the data as a  
18 continuous display," correct?

19 A Yes.

20 Q What is being said here with respect to displays is  
21 precisely what you illustrated to the Court in your lamp  
22 series, isn't that correct?

23 A Generally, yes.

24 Q "To use the multiplexing mode," it goes on.

25 Now, what are NIXIE tubes that are said as an



alternative to the LED display that you in fact used?

A I haven't heard that term in a long time. I believe that is a gas tube that has the numbers in it as different cathodes.

Q Further down on page 53 it indicates, "To avoid flicker, a scan rate of approximately 100 complete scans per second or higher should be maintained."

What did you maintain on the Flicker?

A I don't recall exactly, but I don't believe it was as high as 100.

Q It was somewhat over 60. You found that to be sufficient, is that correct?

A Yes.

Q "Multiplexed displays typically require high peak driving currents to maintain reasonably average brightness."

That was a recognized problem, isn't that correct?

A Yes.

Q It goes on to indicate, "In systems which combine a numeric display and a keyboard, considerable savings in program memory space and external hardware can be achieved by combining the display scan and the keyboard scan."

Mr. Frederiksen, isn't it the case that this disclosure in the MCS-4 manual tells you that, for example, if you want to save on hardware and some memory space, that

1 what you do is put the display and the keyboard in the same  
2 matrix?

3 A. Yes.

4 Q That would affect an external hardware savings,  
5 correct?

6 A. Yes.

7 Q That matrix would then be affected or interrogated or  
8 activated by a common strobe, right?

9 A. Yes.

10 Q That is the same as the common strobe that you illustrated  
11 when you illustrated the single matrix in the Flicker, correct?

12 A. Yes.

13 Q You in fact used on the Flicker machine a MCS-4 system  
14 which is described in the Intel manual, did you not?

15 A. No.

16 Q You didn't use a MCS-4 system?

17 A. I assume by "the system described" that you are referring  
18 to this page.

19 Q No, I am not talking about this page. I am talking about  
20 you used the MCS-4 system about which this manual was written.

21 A. Yes, I did...

22 Q This very system, correct?

23 A. I don't understand what you mean by --

24 Q The very MCS system about which the manual was written?

25 A. Yes.

1 THE COURT: In the Flicker.

2 MR. LYNCH: In the Flicker.

3 BY MR. LYNCH:

4 Q Now, we have over here, if you can recall it, Defen-  
5 dants' Exhibit G -- what is it?

6 MR. GOLDENBERG: 13-B.

7 BY MR. LYNCH:

8 Q -- what will be marked as Defendants' Exhibit 13-B.

9 This blue box says Intellec 4 on it.

10 What is this blue box? Can you recognize it,

11 Mr. Frederiksen?

12 A. Yes.

13 Q What is this device?

14 A. This is the developmental system that is typically used  
15 to develop the 4004 microprocessor program.

16 Q Now, just so the Court understands this, the micro-  
17 processor, the 4004 microprocessor is a CPU -- or, the CPU  
18 chip is contained on one of those small chips on the board in  
19 the back of the Flicker. Correct?

20 A. Yes.

21 Q And then there are ROM memory chips that have the  
22 programmed operation of that device surrounding that on that  
23 board, correct?

24 A. Yes.

25 Q Or I think they were E-PROMS on that board, as a matter

1 of fact, were they?

2 A. Right.

3 Q. Now, and then there were remaining chips in that system?

4 A. Yes.

5 Q. Now, in order to develop a system that operates in the  
6 environment that you desire, you just don't put ROMS in and  
7 see if it works, correct? You don't put them in and put them  
8 on a board and try to play the game and start all over.

9 You use the Intellec system.

10 A. Yes.

11 Q. The Intellec system allows you -- it has what is in  
12 essence a CPU chip in it, correct?

13 A. Yes.

14 Q. And it allows you to create programs to which that CPU  
15 chip will respond.

16 A. Yes.

17 Q. And then you can change that program readily, correct?

18 A. Right.

19 Q. Whereas you cannot change the program that's on one of the  
20 ROM chips or the E-PROM chips that is in the Flicker device  
21 itself as readily.

22 A. Right.

23 Q. You can't change the E-PROMS and you can't change the  
24 ROMS at all, but this is a lot easier, correct?

25 A. Yes.

1 Q And you effect -- you in essence can change them just  
2 by the switch configuration on the front of the Intellec by  
3 flipping the right switches, correct?

4 A Yes.

5 Q So what you can do then is take this device and, by  
6 cabling it up to a device you want to control, you can sit  
7 there, play with the device, see if the response is right,  
8 and then go back and play with the development system to  
9 change the program slightly. Correct?

10 A Yes.

11 Q And that's what is meant by this development system.

12 A Yes.

13 Q When it is cabled to a device such as the Flicker or  
14 such as the IQ Computer, this device will react in the same  
15 fashion as the CPU will react in the back box, if it's  
16 programmed in the same way that the device is. Correct?

17 A From a program point of view, yes.

18 Q The CPU acts the same way, correct?

19 A It interprets the same way, yes.

20 Q And the program acts the same way?

21 A Yes.

22 Q Now, you used a device of this nature, did you not?

23 A Yes.

24 Q Now, as with the MCS-4 system itself, Intel made a manual  
25 that instructed on the use of the Intellec device. Correct?

Frederiksen - cross

1 A. Yes.

2 THE COURT: Before we get to that, Mr. Lynch, this  
3 might be a good time to break for lunch.

4 MR. LYNCH: That's fine, your Honor.

5 THE COURT: Okay. I've got some other matters at  
6 2:00 o'clock that will probably take -- well, half an hour  
7 or so. So I think 2:30.

8 MR. LYNCH: Thank you, your Honor.

9 THE COURT: You may stand down.

10 (Whereupon a recess was taken herein at 12:25 p.m.

11 to 2:30 p.m. of the same day, Thursday, January 5, 1984.)

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1 BALLY MANUFACTURING CORPORATION,  
a Delaware corporation,

2 plaintiff/Counterdefendant,

3 vs.

4 D. GOTTLIEB & CO., a corporation,  
5 WILLIAMS ELECTRONICS, INC., a  
6 corporation, and ROCKWELL INTERNATIONAL  
CORPORATION,

7 Defendants/Counterplaintiffs.

) Docket No.

) 78 C 2246

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) Chicago, Illinois

) January 5, 1984

) 2:50 p.m.

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8 VOLUME III-B

9 TRANSCRIPT OF PROCEEDINGS

10 BEFORE THE HONORABLE JOHN F. GRADY

11 APPEARANCES:

12 For the Plaintiff/  
Counterdefendant:

MR. KATZ  
MR. SCHNAYER  
MR. TONE  
MS. SIGEL

15 For the Defendants/  
16 Counterplaintiffs:

MR. LYNCH  
MR. HARDING  
MR. GOLDENBERG  
MR. ELLIOTT  
MR. RIFKIN  
MR. GOTTLIEB

21 Court Reporter:

22 LAURA M. BRENNAN  
23 219 South Dearborn Street, Room 1918  
24 Chicago, Illinois 60604  
25

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1 MR. TONE: May it please the Court, I have one  
2 question to raise before we start with the witness to avoid  
3 interrupting the cross.

4 We have been handed a document, and I inquired  
5 of Mr. Lynch about it, Defendants' 6-Q. It seems not to have  
6 been in the Section 282 notice as a reference to be relied on  
7 by the defendants.

8 MR. LYNCH: I don't know what it is.

9 MR. TONE: All right, I thought it came from your  
10 side.

11 MR. LYNCH: It undoubtedly does. That doesn't mean  
12 I know what it is.

13 MR. TONE: If you are not going to use it, I will  
14 withdraw it and we won't take the time.

15 MR. LYNCH: I am not going to use it with Mr. Frederik-  
16 sen.

17 MR. TONE: Okay, then let's resolve it later.

18 MR. LYNCH: Oh, sure.

19 MR. TONE: Thank you.

20 JEFFREY E. FREDERIKSEN, PLAINTIFF'S WITNESS, PREVIOUSLY  
21 SWORN.

22 THE WITNESS: Good afternoon, your Honor.

23 THE COURT: Good afternoon.

24 MR. LYNCH: May it please the Court, your Honor?

25 CROSS EXAMINATION (Continued)



## Frederiksen - cross

1 BY MR. LYNCH:

2 Q Earlier, Mr. Frederiksen, the sketch of yours to which I  
3 had reference was 384. I made my own sketch. I wanted to  
4 simulate the colors, but we haven't done that.

5 The sketch that I made that showed seven rows  
6 of digits, four rows of switches, and four rows of lamps, I  
7 will mark for purposes of identification as Defendants' Exhibit  
8 19-A.

9 Now, you testified, Mr. Frederiksen, that the  
10 digits of the type you used were digits similar to digits  
11 that are referred to in the MCS-4 manual, correct?

12 A. Yes.

13 Q The lamps, when it referred to lamps, the lamps you used  
14 were similar to the lamps that are referred to in the MCS-4  
15 manual, correct?

16 A. Yes.

17 Q Now we are left with the switches.

18 Were the switches the same kind of switches  
19 that are referred to in the MCS-4 manual?

20 A. I have a problem with that.

21 Q Okay, what problem?

22 A. The switches that seem to be referred to in the MCS-4  
23 manual are of more conventional nature.

24 Q Than what?

25 A. Than, for example, the springy type of leaf switches

1 that are used in a pinball machine, such as a target.

2 Q So you are saying there are unique type of switches in  
3 the pinball machine?

4 A In a general sense they are not unique in as far as they  
5 make a metallic contact, that is true, but the way that they  
6 are activated is unique, and I just don't wish to confuse  
7 that point.

8 THE COURT: Mr. Lynch, may I interrupt for a moment  
9 to discuss a question of velocity perhaps.

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1 It seems to me that there should be no reason  
2 for the parties to play cat and mouse here on what the inven-  
3 tion is. I do not know whether that is what is they  
4 happening or not.

5 In the usual case, the claims set it forth,  
6 and we look at the claims, and we test novelty and obvious-  
7 ness according to some fairly discrete portions of the patent;  
8 namely, the claims language.

9 Now, here by virtue of Rule 112 or Section 112,  
10 we have got, in effect, an adoption of all the specifications.  
11 I suppose the argument might be that anything in the specifi-  
12 cations is thereby picked up and claimed to be an invention.

13 Now, I do not want to have to go through every  
14 screw and every nut and every bolt in these machines and have  
15 you ask him whether that is his invention and have him say  
16 whether or not it is.

17 Surely, we can agree on the following kind of  
18 statement: This is my invention, A, B, and C. Then you ask  
19 him about that.

20 I am sitting here trying to understand a  
21 whole complex of machinery here, possibly all of which is  
22 necessary for me to concentrate on but very likely not.

23 In other words, what I am suggesting to both  
24 sides is can't this case be simplified a great deal more  
25 than it has up to this juncture?

Frederiksen - cross

1 MR. LYNCH: Your Honor, perhaps it could be. Let  
2 me address that.

3 THE COURT: All right.

4 MR. LYNCH: I believe your Honor heard a great  
5 deal about noise, about things of that nature.

6 THE COURT: Now, I don't know whether that is just  
7 presented by way of general background information. I do not  
8 know whether it is presented as proof of novelty. I do not  
9 know whether it is incorporated in the claims by virtue of  
10 the specifications being related to the claims under Section  
11 112.

12 What are we dealing with here?

13 MR. LYNCH: Unfortunately, your Honor, I have the  
14 same problem.

15 THE COURT: Well, let me ask Mr. Tone. Maybe that  
16 is the place to start.

17 How do you suggest we proceed, Mr. Tone? I  
18 do not want to become a pinball technician in this case.

19 MR. TONE: I understand that, your Honor.

20 The invention is a combination patent as most  
21 inventions are.

22 THE COURT: I understand that.

23 MR. TONE: All right.

24 THE COURT: But what are the elements of the  
25 combination? There are not 150 of them, surely.

Frederiksen - cross

MR. TONE: There isn't any dispute that as in almost every patent case, if not every patent case, most of the elements of the invention can be found someplace or other in some art or other.

THE COURT: Then let's not discuss them. Let's say the following things are new, and let's discuss those things.

MR. TONE: Your Honor, it is the combination that is new, and it is the combination of a pinball machine with a microcomputer through an interfacing system that solves the various problems that can be -- that are inherent in combining a microcomputer with a pinball machine.

Now, Mr. Katz can speak more technologically than I can.

THE COURT: So you are saying that every single nut and bolt in this thing and every single circuit and every single transistor is part of the invention because it all operates to achieve the result you just mentioned?

MR. KATZ: Your Honor, I think as the case progresses it will be shown that although there were a lot of publications, particularly by microcomputer companies, to suggesting that one would desire to use a microprocessor, some other electronic system in pinball games, that no one, in fact, was able to achieve that until the inventor, this inventor, these inventors, Frederiksen and Nutting, made their invention --

Frederiksen - cross

In order to solve the problems that were  
faced, this invention was really the solution to a problem  
that other people did not recognize the magnitude of.

1 THE COURT: What you're saying is that Mr. Lynch's  
2 cross examination is really beside the point, because the  
3 fact that these things might have been known --

4 MR. KATZ: No one had put them together.

5 THE COURT: -- is immaterial. No one had yet --

6 MR. KATZ: Made a practical --

7 THE COURT: -- a Flicker machine.

8 MR. KATZ: Right.

9 THE COURT: And until you've got the Flicker  
10 machine with the yellow and red lights and the flippers and  
11 all that sort of thing, you don't have anticipation.

12 MR. TONE: And until it really works.

13 MR. KATZ: The evidence that the defendants are  
14 going to show is that a lot of people attempted to, or at  
15 least certain people attempted to make a microprocessor  
16 system for a pinball machine, and that it's our position that  
17 they attempted but failed; and that eventually, in fact,  
18 abandoned this whole approach and went to other systems.

19 Also, that this particular system caught on  
20 and became -- displaced all of the prior art machines very  
21 quickly in the marketplace.

22 And it was the fact that we have a recognition  
23 of problems and the solution to those problems to make a  
24 practical machine, whereas other people couldn't recognize  
25 that.

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1 THE COURT: Let me ask the defendants this: We've  
2 got the patent that is presumed to be valid, at least I'm  
3 accepting that as a working hypothesis here.

4 The plaintiff doesn't have to prove anything at  
5 this point.

6 Are you prepared to go ahead with your defense,  
7 so that we know specifically what the issue is, and they can  
8 address themselves to that issue?

9 Otherwise what's going to happen here is,  
10 I'm going to sit here interminably listening to testimony  
11 about this wire and that wire and that circuit and this  
12 strobe and --

13 MR. LYNCH: Your Honor, may I have a moment to  
14 address what counsel is saying.

15 You have a machine there that's a complicated  
16 machine. They are saying that there were problems, these  
17 mysterious problems existed.

18 I have to prove there were no problems, Judge.

19 The digits are the same; the lamps are the  
20 same; now the witness is saying, "Oh, I have a problem with  
21 the switches being the same."

22 I went right through the lamps and the digits.  
23 There's nothing unusual about that.

24 If the Court will understand, the difficulty  
25 we have here is this combination. They are saying all of



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1 this combination works its way into the claims; all of this  
2 becomes part of the mystique of the patent.

3 If, your Honor, the inventor, who is the  
4 person who is primarily responsible for devising this actual  
5 system, can leave and we now have experts commenting on it,  
6 and that's all that I'm left with, that's why this cross  
7 examination is proceeding this way.

8 THE COURT: Oh, I'm not saying that cross examining  
9 the inventor is not essential. It's just a question of when  
10 and --

11 MR. LYNCH: Well, if your Honor would prefer me to  
12 do it in my case, that would be fine.

13 THE COURT: I don't know. I don't know. I'm  
14 starting to get a rather pessimistic view of the progress  
15 of this case, because it seems to me that the focus is  
16 amorphous, or nonexistent, from my standpoint?

17 I mean, the focus is the whole darn machine.  
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1 MR. LYNCH: Correct, your Honor. There's been no  
2 focus on the claims by the plaintiff. There's been no focus  
3 on the claims at all by the plaintiff. It is this mysterious  
4 interface.

5 We read things back and forth. The claim --  
6 if this becomes focused, it becomes, we submit, anticipated  
7 and obvious.

8 But that is one of the difficulties with  
9 which we have to deal as defendants.

10 MR. GOLDENBERG: Your Honor, I think we're where  
11 we are because, when the plaintiff opened its case, and  
12 indeed if you look at their pretrial brief, if you've had  
13 an opportunity to do that, they've totally failed to address  
14 themselves to the one thing which is their burden: Namely,  
15 to prove infringement; thereby putting us in the position of  
16 going forward and putting in our defendants' case to prove  
17 invalidity.

18 Instead, what you heard from the one witness,  
19 not completed so far, is this hocus-pocus, esoteric business  
20 about problems and how he was able to solve them, and com-  
21 pelling us at this point in time to go forward into that  
22 kind of thing.

23 THE COURT: Well, I doubt that I'd be any better  
24 off on infringement than I am on validity.

25 MR. GOLDENBERG: My point is that in doing that,

1 however, they have given you a terribly broad statement of  
2 what the invention is.

3 And as Mr. Lynch has pointed out, they have  
4 not dealt with the claims. Mr. Lynch has attempted to do  
5 that in cross-examination.

6 MR. KATZ: Your Honor, our expert witness --

7 THE COURT: Let me approach it a different way.

8 Now, I think we can agree that something  
9 doesn't have to work perfectly in order to be an invention  
10 on the one hand, or anticipation on the other.

11 So the fact that there may have been problems  
12 or that this one works better than the other one did, if  
13 that be the fact, certainly isn't controlling and probably  
14 isn't material.

15 Can we dispense with the effort to make me  
16 into an electronic pinball technician, and instead focus  
17 on the specific elements or the specific problems that this  
18 invention is said to have overcome?

19 MR. KATZ: Yes, your Honor. And we're planning,  
20 with our expert witness, Dr. Schoeffler -- we wanted to put  
21 the inventors on first --

22 THE COURT: I think that's proper.

23 MR. KATZ: -- and then with Dr. Schoeffler, where  
24 we have claim charts, and he will actually explain how the --  
25 what the particular problems were and the solution to those

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1 problems.

2           And I think the cases are clear that there  
3 can be an invention in the unobvious solution of problems,  
4 or even in the recognition of what the danger of a problem  
5 is, so that one could solve it and, for the first time,  
6 make something possible that theretofore was not possible  
7 by people of ordinary means.

8           THE COURT: I don't argue that. But doing it at  
9 50 miles an hour, whereas previously it was only possible  
10 to go 45 miles an hour, that's not an invention.

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1 MR. KATZ: No, but here we had a long-felt need  
2 that hadn't been picked up over 30, 40 years --

3 THE COURT: If that is the case, fine.

4 MR. KATZ: -- and then suddenly within a two year  
5 period a complete change in the technology that had never  
6 been --

7 THE COURT: All right. Well, I don't want to take  
8 any more time with this.

9 MR. LYNCH: May it please the Court, your Honor, I  
10 certainly do not want to -- I will tell your Honor what I  
11 intend to go through.

12 THE COURT: I am not criticizing what you are doing--

13 MR. LYNCH: No, no, but I --

14 THE COURT: -- and I don't think anybody is inten-  
15 tionally taking more time than you think is necessary.

16 MR. TONE: We are not, your Honor, and we are  
17 trying --

18 THE COURT: I am just trying to see whether there  
19 is some way we can simplify it.

20 MR. LYNCH: Mr. Schoeffler, you see, your Honor,  
21 the expert, Dr. Schoeffler, is not coming on until virtually  
22 the end of the case, the end of their case, which is --

23 THE COURT: I sure don't want any cumulative  
24 testimony of the kind Mr. Frederiksen is giving, by the way.  
25 I mean, I don't want Mr. Nutting to come on here and say

Frederiksen - cross

essentially the same thing Mr. Frederiksen has been saying.

I assume you don't have any plans of that kind.

MR. KATZ: No.

MR. TONE: We have no such plan, your Honor, and also, we might say, we will give heed to your Honor's concerns and make an effort to --

THE COURT: All right, fine.

MR. TONE: -- streamline our case. I hope we will be successful in that, and I hope -- I think with a little reshuffling, we can perhaps bring Dr. Schoeffler in earlier in the proof, and that may help.

THE COURT: See, my inquiry was prompted by the fact that Mr. Lynch and Mr. Frederiksen seem to be locking horns on almost every nut and bolt literally.

"Wasn't this done before?"

"Well, no, not quite this way."

It just seems hard for me to believe that the plaintiff is really saying that every nut and bolt is the invention and that nothing in the world ever worked before in this way.

MR. TONE: We are not saying that.

THE COURT: Yet that is kind of the impression I get from the testimony and the questions that are being asked.

MR. KATZ: Your Honor, the defendants' position has been, as they stated in the opening statement, that if

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1 certain things were done in other art, like in a calculator,  
2 for example, or a keyboard, that you could take that and just  
3 put it into a pinball machine and make it work.

4 Our case is essentially that a lot of people  
5 tried to do that and it couldn't be done because they didn't  
6 understand the problems.

7 MR. TONE: And it required invention to do it.

8 MR. KATZ: It required an invention to actually  
9 make that occur.

10 So the analogies that Mr. Lynch is alluding to,  
11 they involve similar elements but in a different environment,  
12 and that is why the witness is having difficulty with a  
13 simple answer.

14 THE COURT: All right, let's proceed.

15 BY MR. LYNCH:

16 Q Well, having the benefit of that argument, Mr. Frederik-  
17 sen, let me ask you this, and may it please the Court, your  
18 Honor?

19 THE COURT: Yes, go ahead.

20 BY MR. LYNCH:

21 Q There are digits in your pinball machine, LED digits,  
22 correct?

23 A Yes.

24 Q What is the environmental problem about putting LED  
25 digits in the back of a pinball machine?

Frederiksen - cross

1 A None that I am aware of.

2 Q How about lamps; you have them all over the board. What  
3 is the environmental problem about putting lamps all over the  
4 board of a pinball machine?

5 A Filament shock.

6 Q Filament shock, now explain that, Mr. Frederiksen.

7 A In the reference that you asked me to talk about before,  
8 the 1-I reference, it refers to incandescent multiplexing,  
9 but it is with devices that were intended to be multiplexed,  
10 7-segment display devices, incandescent 7-segment display  
11 devices.

12 On the other hand, I was dealing with light  
13 bulbs in a pinball machine, and, as a matter of fact, when I  
14 confronted GE with the problem, they said they had not heard  
15 of anybody dealing with lamps multiplexed in an array like  
16 that and they were concerned about whether or not the lamps  
17 would survive.

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ive1 Q What did your device do about that, Mr. Frederiksen?

2 Is this the low beta transistor?

3 A Yes.

4 Q You put a low beta transistor in, correct?

5 A Soft drive, yes.

6 Q I would like to refer you -- do you have the patent before  
7 you, Mr. Frederiksen?

8 A Yes.

9 Q The low beta transistor is an item, Mr. Frederiksen,  
10 that appears in some of the claims, isn't that correct?

11 A Yes.

12 Q It appears in, I believe, Claim 29, for example, is that  
13 correct?

14 A Yes.

MR. LYNCH: Claim 29 is not in suit, may it please  
15 the Court, your Honor, that claim. We don't have a low beta  
16 transistor. The claim is not in suit.

17 That is one of the difficulties.

18 MR. TONE: Well, your Honor, Mr. Lynch asked the  
19 question and the witness answered it. I think that was all  
20 the witness was talking to. He was not supposed to argue with  
21 Mr. Lynch.

22 MR. LYNCH: I was not reflecting on the witness,  
23 your Honor.

24 THE COURT: On the other hand, as a result of our  
25 colloquy, it is clear that the whole machine is the invention

Frederiksen - cross

and the lamps are part of the machine and the way that works is with this low beta transistor. So the question was certainly legitimate.

MR. LYNCH: That is why I have to pursue it, your Honor.

MR. TONE: And I didn't object, your Honor. I was commenting on Mr. Lynch's apparent concern that his question didn't relate to a claim in suit.

THE COURT: Well, it --

MR. LYNCH: If I may proceed, your Honor, I apologize. That was for the benefit of the Court. It was not intended to reflect on the witness.

THE COURT: No, I understand.

MR. TONE: All right.

THE COURT: But it does raise the possibility that going at it from the other direction, the infringement direction --

MR. LYNCH: It would be a good idea, your Honor.

THE COURT: -- might be a good idea, but maybe we are too far along to change now.

BY MR. LYNCH:

Q Let me just pursue this slightly further.

This low beta transistor, Mr. Frederiksen, where is it shown in the patent?

Is it shown in Figure 5 of the patent?

Frederiksen - cross

(Brief interruption.)

BY THE WITNESS:

A. Yes, the transistors are shown as device 88 and 87.

BY MR. LYNCH:

Q Take a look at device 88, Mr. Frederiksen.

Tell me if that is the position of the low  
beta transistor?

A. Yes.

1 Q It is.

2 Isn't 88 the Darlington, Mr. Frederiksen?

3 A It is 86, as I pointed to down here. I believe that is  
4 the same one that is up here. The ones that are connected  
5 to the lamps are shown as device -- as 86, and it appears as  
6 though 88 and 87 is a detail of what is contained in 86.

7 Q Mr. Frederiksen, referring to your patent, specifically  
8 to -- for example, at the bottom of column 12, it identifies  
9 transistor 88 as a low beta transistor, correct?

10 A Yes.

11 Q Now, isn't it also the case that up above in that same  
12 column at the top it says:

13 "It identifies a pair of Darlington connected  
14 power transistors as 88"?

15 Now, that is in column 12, about line 4,  
16 correct?

17 A What line number was that?

18 Q Line 4, about line 4 or 5.

19 A Yes.

20 Q Now, that 88 there conforms to the description of a  
21 Darlington, and if you go down to column 12, about line 24,  
22 transistor 88 is shown in a grounded emitter configuration  
23 with a collector connected to the mux lines, correct?

24 A Yes.

25 Q Now, it identifies the Darlington as 88, correct?

1 A. Yes.

2 Q A Darlington is not a low beta transistor, correct?

3 A. There are low beta Darlington's and higher beta Darlington's.  
4

5 Q The one you refer to here has a beta of at least a  
6 thousand, correct?

7 A. Yes.

8 Q That is not low beta, is it?

9 A. It is a low beta Darlington.

10 Q It is a low beta Darlington, fine.

11 Is your reference to the Darlington and the  
12 low beta transistor the same transistor?

13 A. Yes.

14 Q So there are not two transistors here. It is a low beta  
15 Darlington?

16 A. Yes.

17 THE COURT: Is Darlington a brand name?

18 MR. LYNCH: It is a generic kind of name, your  
19 Honor. It refers to this type of --

20 Well, let me ask the witness.

21 BY MR. LYNCH:

22 Q Darlington refers to this type of an amplifier-type  
23 unit that has a sequence of transistors in it for general  
24 purposes of the Court, isn't that right?

25 A. Yes.

Frederiksen - cross

1 Q It is a wiring together of several silicon -- several  
2 transistors in a specific way to get a desired and well-  
3 known effect. Is that fair to say?

4 A Well, specifically, two.

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1 Q Go ahead.

2 A Two. It is specifically two transistors. It is the  
3 device shown as 88.

4 Q 88. These two, correct?

5 A Yes.

6 Q Now, isn't it a fact that your specification indicates  
7 that there is another low beta transistor which acts as a  
8 current limiting element for the lamp during initial turnon?

9 It says:

10 "The low beta and low-cost transistor limits  
11 the current. The transistors can readily absorb  
12 the voltage which appears across the transmitter collec-  
13 tor once again because of the very short duration  
14 of time."

15 Now, is that low beta transistor, in fact,  
16 illustrated here?

17 A Excuse me, what were you reading?

18 Q Down at the bottom of column 12, just before the  
19 beginning of the last paragraph, column 12, line 62 and  
20 thereafter.

21 A What is the question?

22 Q The question is isn't it a fact that the low beta  
23 transistor referred to at the bottom of column 12 is, in  
24 fact, not shown? It is described, but it is not shown in  
25 the drawing?

2cbLB

Frederiksen - cross

1 A. I do see that.

2 Q. Where is it?

3 This is the Darlington. As it indicates,  
4 88 is the Darlington that has the grounded emitter configu-  
5 ration, correct?

6 A. Yes.

7 Q. Where is the low beta transistor?

8 A. The Darlington transistor that has the grounding  
9 emitter configuration?

10 Q. It is the same thing?

11 A. Yes.

12 Q. Now, in the Flicker device, where is the Darlington?

13 A. I see a couple of different groups of Darlington  
14 indicated there. The column drivers are the ones that I  
15 am looking for.

16 Q. Do you need it closer, Mr. Frederiksen?

17 MR. TONE: May we have that exhibit number for  
18 the record, Mr. Lynch?

19 MR. LYNCH: I do not know what it is. Let me  
20 see this.

21 (Brief interruption.)

22 BY MR. LYNCH:

23 Q. Your testimony then, Mr. Frederiksen, is that this --

24 Could you come down and draw a circle around  
25 the Darlington transistor, 88, referred to there?



3cbLB

Frederiksen - cross

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You are drawing an orange circle around it.

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Now, where is the low beta transistor?

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A. This Darlington transistor, 88, is here.

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1 Q It is the same as a low beta transistor?

2 A Yes.

3 Q All right. Now, I would like to refer you -- and so  
4 what you are indicating is that a drive transistor with a  
5 beta value about a thousand -- is that the idea here?

6 A Yes.

7 Q -- should be used to drive the columns. Correct?

8 A Yes.

9 Q Now, the reason you say this ought to be done is  
10 because of lamp surge, correct?

11 A Yes.

12 Q And this transistor, this Darlington, creates, shall  
13 we say, let's the current go up slowly?

14 A It's a current limiter, it lets -- it limits the current  
15 until the lamp warms up.

16 Q Until the lamp warms up. So you don't get a surge  
17 going through the lamp immediately, correct?

18 A Yes.

19 Q Now, isn't it a fact that that is a problem at least in  
20 part because the lamps are in the same matrix with the  
21 switches and the digits?

22 A No. It was a problem in the survival of the lamps, as  
23 well as the noise generated by driving --

24 Q Insofar as noise is concerned, insofar as noise is  
25 concerned, all of this low beta means that you don't want

1 any noise from the surge through the lamps to affect anything  
2 else in that single matrix. Isn't that correct?

3 A. As far as the noise is concerned, that's correct.

4 Q. So that's -- so insofar as low beta is a noise abatement  
5 feature of your circuit, it is a noise abatement feature of  
6 your circuit which solves the problem created by the single  
7 matrix circuit. Correct?

8 A. If you're not excluding the fact it's a lamp survival  
9 feature --

10 Q. I said as a noise abatement feature.

11 A. It is also a noise abatement feature.

12 Q. And it is a noise abatement feature, Mr. Frederiksen,  
13 because you have everything in a single matrix, correct?

14 A. No.

15 Q. It is not?

16 A. No.

17 Large surges on the wire can radiate noise,  
18 whether or not they're in the same matrix.

19 Q. Isn't it a fact that the principal noise abatement  
20 feature of that low beta transistor is to prevent the surge  
21 through the entire matrix?

22 A. Yes.

23 Q. And that means that you have everything in a single  
24 matrix, correct?

25 A. Yes.

1 Q Now, that's the lamp difficulty you talked about.

2 Now let's talk about this environmental  
3 difficulty that existed with the switches. What is the  
4 environmental difficulty that exists with the switches,  
5 Mr. Frederiksen?

6 A The speed at which the activation can occur.

7 Q What speed did you find that pinball switches can be  
8 activated at?

9 A We found a variety of speeds, but when they got below  
10 the 50 millisecond point, they became difficult to sense.

11 Q Now let's just describe for the Court what you mean  
12 by 50 milliseconds.

13 A For example, a target switch on a pinball machine,  
14 when it's hit by a pinball moving at relatively fast  
15 speeds, it can close a switch and open it again in a very  
16 short period of time.

17 Q In other words, the contacts of the switch will  
18 remain in contact with one another for 50 milliseconds.

19 A Less than that.

20 Q Well, what range did you find in your experimentation?

21 A I recall it was less than that. It could have been  
22 even briefer than 30 milliseconds, but it was down in that  
23 range.

24 Q 30 milliseconds. Is that the briefest switch closure  
25 with which you had to deal?

1 A. It was in that area. That's what I recall.

2 Q. Can we assume 30 milliseconds?

3 A. Okay.

4 Q. Now, that means -- if I may do this -- that your  
5 computer is sitting along and it's looking and it's not  
6 seeing a signal. And then -- we'll get to bounce in a  
7 minute, let's assume we don't have a bouncing switch,  
8 Mr. Frederiksen -- and it's looking, and then when the  
9 ball hits the switch, bingo, you see a voltage, and that  
10 voltage will stay on the line for a period of 30 milli-  
11 seconds, correct?

12 A. Yes.

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1 Q I mean, that's what we're talking about. And these  
2 are the speeds with which you had to deal, correct?

3 A Yes.

4 Q Now, you're saying that if the switch only stays closed  
5 for that period of time, 30 milliseconds, that means that  
6 your computer has to be prepared to see this voltage within  
7 that 30 milliseconds. Correct?

8 A Yes.

9 Q And if it doesn't see it in that period of time, you'll  
10 miss the switch. Right?

11 A Yes.

12 Q Now, in your matrix, the matrix that you developed,  
13 you had 16 columns. Correct?

14 A Yes.

15 Q And you'd come and look at this column, this column,  
16 this column, all the way to the end, and then you'd go back  
17 to the first column. Correct?

18 A Yes.

19 Q You indicated, I believe, in your direct testimony  
20 that you spent about 1 millisecond per column.

21 A Yes.

22 Q While that column was active. Correct?

23 A Yes.

24 Q So in your device you would come back every 16 milli-  
25 seconds to check each column. Correct?

1 A Yes.

2 Q And it is the case, is it not, that that would mean  
3 that if you had a minimum of 30 milliseconds as a switch  
4 closure, you certainly would have one column strobe of every  
5 column, at least one column strobe of every column, almost  
6 two column strobes of every column, for each switch clo-  
7 sure. Correct?

8 A Yes.

9 Q Now, that 30 millisecond -- in order to accommodate  
10 the speed of closure of a pinball switch, then, you just  
11 had to be sure that you came back and looked at each switch  
12 or each column of switches once every 30 milliseconds.  
13 Correct? Once every 20 or 25 milliseconds. Correct?

14 A Yes.

15 Q Now, what other problems, other than speed, existed  
16 with pinball switches?

17 A The normal response to acting to a switch is to scan  
18 it several times for debouncing and then act on it.

19 One of the problems that we had in the pin-  
20 ball machine is that we were forced to check it for noise,  
21 act on it, and then sample it for debounce; something that  
22 was not taught in those days.

23 Q Well, let's worry about -- you're saying that you  
24 devised a way to check the switch for noise?

25 A Yes.

1 Q I'm going to get to noise in a moment.

2 Other than the 30 milliseconds -- and there  
3 we dealt about noise in the switch and noise that might  
4 come in from somewhere else, too, correct? We dealt with  
5 all that?

6 A Yes.

7 Q Okay. Let's just talk about the switches.

8 Other than noise problems caused by noisy  
9 switches or caused by noise coming in from somewhere else,  
10 what other problems other than coming back once every 25  
11 milliseconds did you have to solve when you considered pin-  
12 ball switches?

13 A Resolving the debounce problem with the short time  
14 allowed.

15 Q You had to resolve the debounce problem?

16 A Yes.

17 Q And that meant that if the switch -- let me see if  
18 we can explain: Instead of having a 30-millisecond closure,  
19 as I've shown, A, which is a nice, clean closure -- that's  
20 a nice, clean closure, isn't it?

21 A Yes.

22 Q -- is what you are saying that you could have a situa-  
23 tion that the ball hits the switch and the first thing it  
24 does, it goes brrt --

25 A Yes.



1 Q -- before it settles down.

2 MR. LYNCH: (To the reporter) I'm sorry. B-r-r-r  
3 is what I would suggest.

4 BY MR. LYNCH:

5 Q The switch is going to close and open several times,  
6 correct -- or could close and open several times, just  
7 because it gets hit very hard, and then finally it's going  
8 to close. Correct?

9 A Yes.

10 Q Now, in this initial time period, if you see the  
11 switch open -- or, if you see the switch closed, you don't  
12 want the machine to come down here and see it closed again,  
13 correct?

14 A No, that's not correct.

15 Q Well, let's talk about the debounce.

16 A Maybe just -- I don't want to act on the switch again;  
17 it may still be closed.

18 Q Ah. Okay. You don't want to count it twice, you  
19 don't want to see it as a second valid switch closure.

20 A That's correct.

21 Q Okay. That's what I meant to say.

22 So you looked at it here, and you looked at  
23 it here, and then you knew you're going to look at it again  
24 in 16 milliseconds, which is about where I put the other  
25 arrow. Right?

A Yes.

1cbCD

Frederiksen - cross

1 Q You said to yourself, "Well, I certainly have to make  
2 sure that I don't give this guy credit for hitting the  
3 target twice," correct?

4 A Right.

5 Q Right. "So what I am going to do is I am going to  
6 give the computer an instruction --" and from here on we  
7 are talking software, aren't we, Mr. Frederiksen, about  
8 the solution of this problem?

9 A Yes.

10 Q What you did from then on is you said, "Okay, computer,  
11 when you see a switch closed and then you come back in  
12 16 milliseconds and you see it closed again, what I want  
13 you to do is effectively ignore what you see from the  
14 switch the second time if the switch is in the same condi-  
15 tion that you saw it the last time," correct?

16 A Yes.

17 Q Now, you would have had the same problem with a non-  
18 noise switch closure of 30 milliseconds, would you not?

19 A Yes.

20 Q You would have to do the same thing, correct?

21 A Yes.

22 Q If you had a 50 millisecond switch, and you knew  
23 some of them could get sticky perhaps, you would have to  
24 ignore all of that, correct?

25 A Yes.

2cbCD

Frederiksen - cross

1 Q Now, in that situation in your Flicker machine and in  
2 your development, let's say there was a very, very, very  
3 light switch closure of 5 milliseconds.

4 Would you see it?

5 A. Statistically occasionally.

6 Q. Once out of three times, about 5 over 16, correct?

7 A. Yes.

8 Q. About. If you had a 1 millisecond switch closure, you  
9 are going to see it about a sixteenth of the time, correct,  
10 statistically?

11 A. Yes.

12 Q. If you have an 18 millisecond switch closure, you are  
13 going to see it all the time?

14 A. Yes.

15 Q. Correct, but as soon as you know you have a switch  
16 closure that is longer than your strobing interval, you  
17 immediately know that you could see that switch on two  
18 successive strobes, isn't that correct?

19 A. Yes.

20 Q. So your testimony is the problem that you had to solve  
21 was to tell the computer in software to ignore the second  
22 closure, the second indication of closure as a valid switch  
23 closure when there was no change from what the computer saw  
24 the prior time, correct?

25 A. Yes.

1 Q Fine. Now, are those the only problems that existed  
2 with switches in a pinball environment?

3 A Excluding the noise question, yes.

4 Q We will get to noise in a moment.

5 That was the noise of the spike, the bil-  
6 lionths of a second spike you are talking about that you  
7 testified?

8 A Yes.

9 Q So when we go back to your matrix, have we set forth  
10 all of the problems unique to this pinball environment  
11 that you had to overcome?

12 A In conjunction with the matrices or matrix, yes.

13 Q When you began -- may it please the Court, your Honor,  
14 I don't know if the Court still has a copy of Plaintiff's  
15 Exhibit 7 and Exhibit 8.

16 THE COURT: What is it?

17 MR. LYNCH: They are those switches that were  
18 referred to on direct, your Honor.

19 THE COURT: Yes.

20 BY MR. LYNCH:

21 Q I place before you, Mr. Frederiksen, a copy of Exhibit  
22 7 and Exhibit 8.

23 (Brief interruption.)

24 THE COURT: I think, if you don't mind, we will  
25 take our afternoon recess now of about ten minutes.

MR. LYNCH: Thank you, your Honor.

(Brief recess.)

MR. LYNCH: May it please the Court, your Honor?

THE COURT: Yes.

BY MR. LYNCH:

Q Mr. Frederiksen, you mentioned Plaintiff's Exhibit 7 and Plaintiff's Exhibit 8, both of which are sketches that you made on the blackboard, I believe you testified, sometime in late 1973, correct?

A Yes.

Q These sketches, of course, were not reproduced at that time, but during the course of the proceedings before the Patent Office, from your recollection, you reproduced these sketches that were on the blackboard, correct?

A Yes.

Q Now, the first of the sketches, Exhibit 7, shows digits, lamps and switches arranged in a single matrix, correct?

A Yes.

Q Down at the bottom you have a series of functions ascribable to the solenoids?

A Yes.

Q And those functions are pinball functions, correct?

A Yes.

Q Now, this is what you put on the board as a system for a pinball machine supposedly in December '73 or

1 thereabouts?

2 A Yes.

3 Q You did not write this down on a piece of paper at  
4 that time?

5 A No.

6 Q There is, in fact, no paper dating from that period  
7 of time that shows anything of a matrix for a pinball  
8 game, correct?

9 A To the best of my knowledge.

10 Q The fact is nothing that shows a matrix or any type  
11 of game dating from that period of time on a piece of paper,  
12 is there?

13 A Not by my hand.

14 Q Now, what is there in Plaintiff's Exhibit 7 that shows  
15 that you -- that address the particular problems that you  
16 have been explaining that exist in a pinball environment?

17 A Nothing.

18 Q So insofar as the sketch of Exhibit 7 is concerned,  
19 this is a sketch of a matrix with things in the matrix,  
20 but it does not address the problems of a pinball environ-  
21 ment, does it, Mr. Frederiksen?

22 A If by address the problems you mean the things such  
23 as the noise and the bounce and whatnot, no, it does not.

24 Q It does not have any of those elements in it.

25 Refer to Plaintiff's Exhibit 8 now, Mr.

1 Frederiksen.

2 Plaintiff's Exhibit 8 is a copy of another  
3 sketch you put on the board, correct?

4 A Yes.

5 Q There is no paper record of this sketch dating from  
6 late 1973, is there?

7 A No.

8 Q This sketch you put on the board in the presence of  
9 a number of other individuals, correct?

10 A Yes.

11 Q Whom did you indicate you put them on the board in  
12 the presence of?

13 A Duane Kundtson, Phil Tai and Bill Levine.

14 Q Do you remember that clearly, Mr. Frederiksen, that  
15 incident when you put this Exhibit 8 on the board?

16 A Yes.

17 Q Do you remember clearly the instance where you put  
18 Exhibit 7 on the board?

19 A Fairly clearly. I recall the drawing of it on the  
20 board.

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1 Q Your deposition was taken in this case, wasn't it?

2 A Yes.

3 Q In that deposition at page 861, I asked you,

4 Mr. Frederiksen, "Do you recall your testimony about sketches  
5 having to do with microprocessor game controllers being made  
6 on the blackboard at Dave Nutting Associates or Milwaukee  
7 Coin prior to January 1974?"

8 You answered, "Yes."

9 These are the sketches I was asking you about.  
10 You understood that, didn't you, Mr. Frederiksen, Exhibits  
11 8 and 9?

12 A I don't remember for sure. I have to take a look at what  
13 preceded that.

14 Q That question (indicating).

15 (Brief interruption.)

16 BY THE WITNESS:

17 A Okay.

18 BY MR. LYNCH:

19 Q The sketches we are referring to are the sketches of  
20 Exhibits 8 and 9, correct?

21 A Yes.

22 Q Those were the sketches that you knew I was referring  
23 to at the time of your deposition, correct?

24 A Yes.

25 MR. TONE: Mr. Lynch, you said 8 and 9. You mean --



MR. LYNCH: I mean 7 and 8. I am sorry, 7 and 8.

BY MR. LYNCH:

Q The next question, "Who are the people at Milwaukee Coin or Dave Nutting Associates at that time who were familiar with the contents of those drawings placed on the board?"

"I do not recall, except for Dave Nutting," you answered.

"Q Dave Nutting saw them; is that your recollection?"

"A Yes.

"Q And you saw them?"

"A Yes.

"Q Anyone else?"

"A Other employees.

"Q Who?"

"A I do not recall."

When did you recall who was present when these sketches on the blackboard were put up, Mr. Frederiksen?

A My recollection is that testimony was in reference to Exhibit No. 7. That first explanation was made to Dave Nutting and other employees, and I still do not recall.

Q Ah, but it wasn't in reference to Exhibit 8?

A No, it was not.

Q Did you identify Mr. Tai as one of the Intel representatives in your deposition?

1 A. I don't recall.

2 Q. You did identify Mr. Levine, but did you identify  
3 Mr. Tai?

4 A. I don't believe so.

5 Q. Now at this time when you put this on the board, it had  
6 nothing particular to do with pinball, but when you put 7 and  
7 8 on the board, Mr. Frederiksen, you had in mind other games  
8 as well, correct?

9 A. Yes.

10 Q. In fact, Mr. Nutting wanted you to develop a controller  
11 for all types of games, correct?

12 A. No.

13 Q. All types of games that had --

14 A. No, he wanted me to develop specifically control logic  
15 for a pinball machine. Any generalizations from that were  
16 taken on by me directly, not by assignment.

17 As a matter of fact, Mr. Nutting rathered that  
18 I use random logic for most of the implementations because the  
19 other games were substantially simpler.

1 Q Let me put it this way: The work, the first work that  
2 you did with respect to implementing microprocessor control  
3 of any game went to an IQ Computer. Correct?

4 A Yes.

5 Q And that was a quiz game, correct?

6 A Yes. Yes.

7 Q In that quiz game you had digital displays, lamps  
8 and switches, correct?

9 A Yes.

10 Q You arranged them in a matrix, correct?

11 A Yes.

12 Q And in fact, that occupied the majority of your time  
13 from the time you put this on the board in December of '73  
14 until the end of June of '74. Right?

15 A Yes.

16 Q You were working on the IQ Computer because there  
17 was a desire to get money in and it was thought the IQ  
18 Computer would be a commercial game. Correct?

19 A Yes.

20 Q Now, the IQ Computer had lamps, digits and switches;  
21 did it have the same problems that are created for lamps,  
22 digits and switches in a pinball environment?

23 A In some aspects, yes; in others, no.

24 Q Which ones did it have?

25 A The multiplexing the lamps was a similar problem,

1 since the ruggedness of the lamps were still very uncertain  
2 at that time.

3 The switches were not a similar problem,  
4 since the activation of switches was much longer duration,  
5 human interaction type; more of a calculator type, as a  
6 matter of fact.

7 The shock from solenoids and whatnot affect-  
8 ing switches and bounce of that nature didn't exist in  
9 the switches, either.

10 Q So then you proceeded with the IQ Computer.

11 Did you have in mind all of these solutions  
12 for pinball switches when you were doing the IQ Computer?

13 A No.

14 Q When did you eventually then come to the invention  
15 we're talking about here, the pinball game? When did you  
16 first conceive of how to put all these items in this ad-  
17 verse pinball environment?

18 A When we built the pinball machine.

19 Q So that was in June of '74?

20 A It began at the end of June of '74.

21 Q And your prior work with the IQ Computer and your  
22 prior work insofar as it related to drawings on the board,  
23 then, did not address these particular problems of a pin-  
24 ball game, did they?

25 A Some of the particular problems. But, as you asked

1 me earlier, did it address all the problems of the pin-  
2 ball: No. Some of them it did.

3 Q It didn't address all of them. Didn't address the  
4 switch problem, correct?

5 A No, it didn't.

6 Q It didn't address the solenoid problem?

7 A I don't recall the solenoid content in the IQ Com-  
8 puter at this time.

9 We had motors. It was a projector system.

10 Q So then you didn't begin addressing the problem and  
11 solving the problem of a pinball game controlled by a  
12 microprocessor until June '74. Correct?

13 A No. We began the solution from the beginning; all  
14 the pieces were not concluded in that time frame.

15 Q So you didn't know how to do it until the end of  
16 June of '74, correct?

17 A I'm not sure I knew it even then.

18 Q You didn't conceive of all of the solutions that you  
19 needed for a pinball game until June of '74, correct?

20 A It may have been even later.

21 Q So you may not have even conceived of how to inter-  
22 face a computer with this harsh pinball environment com-  
23 pletely until after June of '74?

24 A As far as completely, in conjunction specifically with  
25 the switch problem, yes.

1 Q Now, when you began and first filed your patent appli-  
2 cation involved here, Mr. Frederiksen, you initially ad-  
3 dressed the invention broadly to a game type apparatus.  
4 Isn't that correct?

5 A Yes.

6 Q And in fact, when your patent issued the first time,  
7 prior to the reissue, claim 1 specified broadly a game  
8 apparatus. Isn't that correct?

9 I don't think you can tell from the reissue  
10 patent, Mr. Frederiksen.

11 I've put claim 1 of the reissue there.

12 And I don't know if you recall that the italicized words  
13 were added and the bracketed words were deleted.

14 Do you recall that your patent as it ori-  
15 ginally appeared was directed to a game apparatus having  
16 only somewhere in it a physical mass capable of motion?

17 A Yes.

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Frederiksen - cross

1 Q And the IQ Computer was such a device, was it not?

2 A Yes.

3 Q It had a physical mass because the film had to be dis-  
4 played, and things rolled around in it, correct?

5 A Yes.

6 Q When this was resubmitted to the Patent Office, the claims  
7 were changed in every instance to indicate that the mass is  
8 a surface projectile, is that correct?

9 A Yes.

10 Q Now, that meant that the claims now were directed to a  
11 specific type of game. The game had to be a surface projectile  
12 kind of game, correct?

13 A Yes.

14 Q Surface projectile kind of game is a game that is, for  
15 example, a pinball game where a ball rolls around a play-  
16 field, correct?

17 A Yes.

18 Q But it could be another type of game, could it not?

19 A Yes.

20 Q It could be, for example, a bowling game?

21 A Yes.

22 Q But it does not include a gun game?

23 A No.

24 Q It would not include a driving game?

25 A No.

2  
1 Q Now, in that context, what is the particular problem  
2 that in your experience is introduced by this surface projec-  
3 tile?

4 A The speed at which it acts upon the switches.

5 Q Are you talking about all surface projectile games or  
6 just pinball?

7 A Well, let's, for example, suggest also a shuffle alley,  
8 which had relatively fast projectile.

9 Q So what you are saying here it is a fast surface pro-  
10 jectile game?

11 A Yes.

12 Q Now, that addresses the switches, correct?

13 A Yes.

14 Q But the difference between a surface projectile game  
15 and another game does not address difficulties that exist with  
16 lights in an arcade, does it?

17 A Lights in an arcade. I am confused by that.

18 Q Well, the fact that it is a surface projectile game, does  
19 that affect how you would treat lights, for example, in the  
20 IQ Computer and in the game itself?

21 A No.

22 Q Does it affect how your displays are treated?

23 A No.

24 Q Now, we are down to the invention involving specifically  
25 pinball in some of the claims as well.



1 Do you regard pinball as a specific type or  
2 presenting specific problems beyond problems of an ordinary  
3 fast surface projectile -- surface projectile game?

4 A. There are some peculiar problems.

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Frederiksen - cross

-2b1

ems 1 Q Are those problems that we have addressed here with the  
2 switches, digits? We have addressed them all in your testi-  
3 mony?

4 A Yes.

5 Q Let me go briefly over some of that testimony you had  
6 with respect to noise.

7 Mr. Frederiksen, you talked about noise as  
8 being a problem. So we understand the context in which all  
9 that was done, I would like to make a brief choice and go to  
10 noise, the problems you saw, and your solutions or fixes for  
11 them.

12 First of all, you indicated that there was  
13 this noise spike that could exist, correct?

14 A Yes.

15 Q The noise spike was on the order to be measured as  
16 billionths of a second as opposed to thousandths of a second,  
17 correct?

18 A Yes.

19 Q If one of those noise spikes happened to come over a  
20 wire at precisely one of the times that you were looking for a  
21 switch closure, you might sense a switch closure that was not  
22 there, isn't that correct?

23 A Yes.

24 Q Now, we are talking about billionths of a second. So  
25 statistically there was not a high likelihood that that would

1 occur, isn't that correct?

2 A It depends upon the density of the noise.

3 Q I understand that.

4 Statistically, it was not --

5 Well, what do you regard as statistically the  
6 likelihood that something measured in billionths of a second  
7 would be detected?

8 A It can vary from falsings in the per-second range to the  
9 falsings in the per-year range. It can vary dramatically.

10 Q Okay.

11 A In our instance we were seeing problems with noise  
12 sources that could cause falsings several per game.

13 Q Several in a several-minute game?

14 A Yes.

15 Q Now, your fix for that, Mr. Frederiksen, was to come along,  
16 and when I say you looked at this point, in fact, what you  
17 did, and I am embellishing on my prior sketch that showed the  
18 30-millisecond spike and the bounce -- I am embellishing on  
19 that, and for purposes of the record, I will mark that as  
20 19-B -- I am embellishing on that.

21 In this period of time that you were on each  
22 column, you would look two times. I am just going to put,  
23 "Look twice."

24 Isn't that right?

25 A Yes.

1 Q What you said was, "I am going to look two times maybe  
2 10 millionths of a second, 20 millionths of a second apart,"  
3 correct?

4 A. Yes.

5 Q What is the likelihood that I am going to see the spike  
6 both times that I looked because I am looking at billionths  
7 of a second, correct?

8 A. Yes.

9 Q Now, that I believe you called double sampling?

10 A. Yes, double sensing.

11 Q Oh, you called one double sensing and one double  
12 sampling. I just want to keep them apart.

13 . You called the thing for bounce also --  
14 well, never mind.

15 You called it double sensing. So what you  
16 did was double sense.

17 Now, if it so happened that you were so  
18 unlucky as to see a noise spike at both instances at both  
19 times you sampled, the computer would regard that as a valid  
20 switch closure, correct?

21 A. Yes.

22 Q And there would be an error, correct?

23 A. Yes.

24 Q This double sensing, therefore, was accomplished also  
25 in software, isn't that correct?

1 A. Yes.

2 Q. You told the microprocessor, "When you are on each  
3 column, look for a switch closure. Stop. Do a little  
4 something else. Look for a switch closure again 20  
5 millionths of a second later," correct?

6 A. Yes.

7 Q. Now I would like to -- do you have the Intellec  
8 manual before you?

9 I don't think so. Here is a copy of it.

10 What I am giving you is the Intellec  
11 manual, Mr. Frederiksen, Exhibit 1-N.

12 May it please the Court, I don't think the  
13 Court has one.

14 THE COURT: All right, thank you.

15 BY MR. LYNCH:

16 Q. This Intellec manual, Mr. Frederiksen, is a book you  
17 also had available to you and in fact in early '74, isn't  
18 that correct?

19 A. It is hard for me to recognize the Xerox.

20 Q. I don't know that I have anything other than a Xerox,  
21 Mr. Frederiksen.

22 A. Is there a date on the manual?

23 Q. Yes, I am sure there is.

24 Here is the original. Perhaps that will  
25 assist you.

1 A. Thank you.

2 I can't say for sure that this manual is  
3 one that I had at that time. According to the back of  
4 this one here, it wasn't even printed until 1974 and it  
5 may not have been available to me when I began.

6 Q. What does the code say about that manual on the last  
7 page?

8 I am given to understand there is a code.  
9 MCS 09347415.

10 Did you have any manual at all to help you  
11 with the Intellec when you got the Intellec machine, Mr.  
12 Frederiksen?

13 A. Yes.

14 Q. You did have an Intellec manual then?

15 A. Yes.

16 Q. You just don't remember if this is the one or not?

17 A. Yes.

18 Q. I would like to refer you to page 118 of that manual  
19 and ask you just open it to that page.

20 The Intellec that is over here, Mr.  
21 Frederiksen, is similar to the Intellec you had, correct?

22 A. Yes.

23 Q. This Intellec was hooked up at at least one period of  
24 time to the pinball game through a cable, is that right?

25 A. The one that we had was, yes.

4cbQD Q Not this one; your Intellec was hooked to a pinball  
1 game through a cable, and then you were attempting to fine  
2 tune the game, develop the software for the game, as you  
3 testified earlier, with the Intellec, correct?  
4

5 A. Yes.

6 Q When you attach a device like this through a cable,  
7 that cable traveling into the other device, did it present  
8 a problem for you?

9 Let me ask you this. Did the device operate  
10 any differently because it was on the cable rather than the  
11 back box as the CPU is now?

12 A. Yes, it operated differently.

13 Q How?

14 A. It was more noise susceptible.

15 Q More noise susceptible. Noise susceptibility would  
16 come in through where?

17 A. Radiation potentially into the wire.  
18  
19  
20  
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-1 b1

Frederiksen - cross

1 Q Into the wires that were connecting the big box to the  
2 pinball box, correct?

3 A Yes.

4 Q And they had to travel through the air over a certain  
5 distance, correct?

6 A Yes.

7 Q And that is the source of the potential noise. Is that  
8 what you're saying? That is, those wires could pick up stray  
9 signals?

10 A Yes.

11 Q Now, referring to page 118 of that manual, it indicates  
12 at the top that "input signals must pass through ribbon cable  
13 and the like." At the top of this right-hand column.

14 A Yes.

15 Q It is addressing at least in part, is it not, noise that  
16 would come into your system as a result of the fact that they  
17 knew your Inteltec had to be hooked up to whatever you were  
18 working with through a cable, right?

19 A I have to read a little bit before that, if you'll excuse  
20 me one second.

21 (Brief interruption.)

22 BY MR. LYNCH:

23 Q Let me ask you this: Read in the second paragraph in the  
24 right-hand column, Mr. Frederiksen; it indicates that cross  
25 talk effect is relatively short-lived, that there are



Frederiksen - cross

spurious signals which are virtually subsided -- I can't read it completely -- the spurious signals will subside in 115 nanoseconds. Correct?

A. Yes.

Q. Now, that 115-nanosecond spurious signal -- a nanosecond is a billionth of a second, correct?

A. Yes.

Q. That is the kind of noise spike which you were addressing here in your noise, correct?

A. Yes.

Q. Now, what does it indicate that you should do to eliminate those noise spikes?

If you read down in the next to last paragraph in the same column, "The Intellec 4 can be programmed to sample the control bit twice and test for continuity. A control signal may be considered valid only if it remains constant for the entire period between the two successive tests."

Correct?

A. Yes.

Q. Is that what you did with your double sensing?

A. Yes.

Q. Now, when you had the Intellec, you did that with software, correct?

A. Yes.

Frederiksen - cross

1 Q You developed a software on the Intellec.

2 A Yes.

3 Q If you read the manual the Intellec would have told you  
4 to put such software in your system. Isn't that correct?

5 A If it was this manual.

6 Q Yes, or if that manual were out; it would have told you  
7 to do that, isn't that correct?

8 A Yes.

9 Q And then if you developed the software in the Intellec,  
10 when you dumped it onto the paper tape, that same software  
11 would have been included in the Flicker. Isn't that correct?

12 A Yes.

13 Q Let's take the next item -- and that is precisely what  
14 you did with your double sensing and software. Isn't that  
15 right, Mr. Frederiksen?

16 A Yes.

17 Q The second item you testified about was bounce. And the  
18 routine with the 30-millisecond item on 19-B where we drew  
19 the 30-millisecond pulse and we explained the 16-millisecond  
20 cycle, that explained what you did about bounce. Isn't that  
21 correct?

22 A Yes.

23 Q In other words, you made sure that you had to look twice  
24 within the switch closure, and then you would also ignore the  
25 second switch closure if it was the same as the first.

1 A. Yes.

2 Q. The bounce -- let me put Exhibit 19-B.

3 The third item you testified about as being a  
4 noise problem was lamp interference. I'll call that "Lamp  
5 intf." And you indicated your solution to that was what,  
6 Mr. Frederiksen?

7 A. Line sampling.

8 Q. Reading the lamps last. Isn't that right?

9 A. The switches.

10 Q. The switches last, I'm sorry.

11 So what you did was, you told your software:  
12 Do everything you've got to do while you're on this column,  
13 and the last thing I want you to do is read the switches.

14 A. Yes.

15 Q. Because what I'm telling you is that, if you do it that  
16 way, then all of this spurious signal hopefully will have  
17 ended and gone away by the time I read the switches. Correct?

18 A. Yes.

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Frederiksen - cross

1 Q Now, this was also an item that was incorporated en-  
2 tirely in the software or in the program of your device, isn't  
3 that right?

4 A Yes.

5 Q The next items you testified about were on the output  
6 side, you had lamps and solenoids that could create problems.  
7 I believe you indicated that these first were inputs.

8 A Yes.

9 Q Noise considerations, isn't that right?

10 A Yes.

11 Q The next were output noise considerations, and you said  
12 lamps and solenoids could create problems that you addressed  
13 with the self-cleaning feature?

14 A Yes.

15 Q Was that the fix for it, the self-cleaning feature?

16 A Yes.

17 Q I will not go into it. Suffice it to say that was wholly  
18 in the software device as well, is that correct?

19 A Yes.

20 Q Next you addressed, I believe, input and output noise  
21 together, and you indicated that there was noise from the  
22 coffin.

23 A I do not recall using that term. You mean --

24 Q Noise from all of the switch closures that were going on  
25 in the principal box.

Frederiksen - cross

1 A. The bottom cabinet?

2 Q. The bottom cabinet, I am sorry. I thought you said  
3 coffin. I take the coffin to mean the bottom cabinet.

4 A. Yes.

5 Q. The fix was to put the microprocessor in the back  
6 cabinet, correct?

7 A. Yes, partially. There were other things.

8 Q. Well, specifically, you addressed the noise in the coffin  
9 in that fashion other than the items that we have indicated  
10 here.

11 Well, what other ways did you address noise  
12 in the bottom cabinet?

13 A. There might be just a bit of confusion from this in my  
14 mind, but the current surges from the devices turning on and  
15 off, such as the lamps and solenoids, were solved as well by  
16 putting the logic on a daughter board to the mother board.  
17 This again was --

18 Q. I was going to get to that.

19 A. -- a type of noise in the bottom cabinet.

20 Q. That was also, I thought, insulating the mother board  
21 from the daughter board, correct?

22 A. Yes.

23 Q. I think you called that a little bit like noise from  
24 coupling. Let's just put noise resulting from what?

25 A. High currents, high current noises.

Frederiksen - cross

1 Q High current.

2 You fixed that by the mother/daughter board,  
3 correct?

4 A Yes.

1 Q Now, that simply meant that you took the high current  
2 items and you put them in one place, and you took the low  
3 current items and you put them in another board?

4 A Yes.

5 Q They are right next to each other in the back of the  
6 cabinet, right?

7 A On top of each other.

8 Q They are on top of each other in the back cabinet. They  
9 are not next to each other?

10 They are both --

11 A Both next and on top.

12 Q -- next to each other and on top of each other?

13 Then you also indicated that you had this lamp  
14 surge current thing that you solved with a low beta transistor,  
15 correct?

16 A Yes.

17 Q Then it is clear that all of the solutions up to these  
18 last three are software solutions that are accomplished in  
19 the programming of the device, correct?

20 A Yes.

21 Q Now, in your testimony, in your deposition, Mr. Frederik-  
22 sen, when you testified about noise --

23 Well, you were asked about noise in connection  
24 with the Flicker.

25 At that time do you have a recollection that

1 you testified that there was no indication to test the Flicker,  
2 and you had not had any noise problems at that time?

3 MR. TONE: I object to the form of the question, your  
4 Honor.

5 THE COURT: Well, you might as well read the  
6 question.

7 MR. LYNCH: I will show it to the witness.

8 BY MR. LYNCH:

9 Q I will ask you, Mr. Frederiksen, to read your deposition  
10 at page 172.

11 The first question is:

12 "When you say the Flicker game was completed,  
13 tell me what you mean."

14 Then reading on to page 173 --

15 THE COURT: You mean you want him to read it out loud?

16 MR. LYNCH: No.

17 THE COURT: To himself.

18 (Brief interruption.)

19 MR. LYNCH: Let me read it.

20 BY MR. LYNCH:

21 Q At that point you were asked, Mr. Frederiksen:

22 "Q This game Flicker -- when you say the Flicker  
23 game was completed, tell me what you mean.

24 "A That is a tuned-up, demonstratable level. This  
25 is -- the game is first brought up to a complete hardware



level, which is turned over for software programming.

"The software programming is then brought up to an operational level, which is then turned over to the games designer, Dave Nutting in this case.

"That is then tuned in, which is probably the longest period of time, until it receives a final operational level.

"That final operational level is what I refer to as completion.

"Q Was the game percentaged?

"A No.

"Q Was it tested for noise problems?

"A We hadn't any noise problems at that time. We had no indication to test."

You did testify that way?

A Yes.

1 Q When you completed Flicker, was it tested for noise  
2 problems?

3 A It was tested for noise problems in conjunction with  
4 the completion. After completion we had already performed  
5 our tests; no further noise testing was done.

6 Q Ah, so what you are saying here is that after you had  
7 done all the testing, you thought this question meant that  
8 after everything was completed, you didn't do any more  
9 tests?

10 A Yes, you had asked at that time when I was done with  
11 the pinball machine, and that had assumed the program was  
12 done, too, and as you pointed out, you know, most of the  
13 problems were solved with software. So I had to, of course,  
14 finish the software before it was at the completed level,  
15 and by that time the noise testing was done.

16 Q So when you --

17 A I am sorry if I misunderstood your question at that  
18 time.

19 Q It was Mr. Goldenberg's question, I believe, Mr.  
20 Frederiksen.

21 THE COURT: That accounts for the problem.

22 MR. LYNCH: Oh, I am always adamantly clear.

23 MR. GOLDENBERG: Your Honor, I thought it was one  
24 of my better questions in the course of that day.

25 MR. LYNCH: I couldn't resist, your Honor. I

1 am sorry.

2 BY MR. LYNCH:

3 Q Now, you also testified about the differences that  
4 existed when the Intellec was attached to the box and when  
5 the Intellec wasn't attached to the box.

6 A Yes.

7 Q What are the differences, other than noise problem  
8 differences that you have addressed?

9 A Well, not pointing to the trivial portions of that--  
10 obviously I had to put the microprocessor in the machine  
11 in a form that was described by the manual as far as  
12 using the components -- but the noise problems were the  
13 primary problem. In its external condition, it was not in  
14 a position to be testable for the use it was intended,  
15 and that is the arcade.

16 Q With the device sitting out here, the Intellec  
17 sitting next to the pinball machine, it was not suitable  
18 for use in an arcade; is that what you are saying?

19 A Yes.

20 Q You did demonstrate the Super IQ Computer to the Bally  
21 people, didn't you, Mr. Frederiksen?

22 A Yes, I did.

23 Q You demonstrated that to those people hooked up to  
24 the Intellec, correct?

25 A Yes, I did.

1 Q That device was intended to be used in arcades,  
2 wasn't it?

3 A Yes.

4 Q And at airports?

5 A Yes.

6 Q And at other places?

7 A Yes.

8 Q When you demonstrated that to them, did you demon-  
9 strate it in a way that it wasn't suitable for use?

10 A Yes.

11 Q What was the purpose of demonstrating something that  
12 wouldn't be useful at all to the Bally people with the  
13 Super IQ Computer?

14 A Well, of course the IQ Computer when finally completed  
15 to a production level would have been useful.

16 At that time, though, we had demonstrated  
17 it in a lab environment. This was a conference room. It  
18 was a well-controlled situation.

19 Obviously we were looking for encouragement  
20 that they would be interested in marketing that product before  
21 we pursued it to a conclusion.

22 Q So you were satisfied and they were satisfied that  
23 you could demonstrate it to them with the Intellec outside  
24 the IQ Computer and you were confident and they were con-  
25 fident that you could put the guts of that inside the box

1 of the IQ Computer; isn't that a fact?

2 A I don't know what their confidence level was, but I  
3 was sure that I could.

4 Q You were sure that you could at that time, correct?

5 A Yes.

6 Q As of that time, you hadn't even appreciated all of  
7 the problems of the pinball game, is that correct?

8 A That is correct.

9 Q But you were confident you could put it in the box?

10 A Yes.

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1 Q Now, you came to the demonstration of the pinball  
2 game to the Bally people, correct?

3 A Yes.

4 Q That was in September of 1974?

5 A Yes.

6 Q You demonstrated it with the device inside the box  
7 as opposed to on a cable attached to the box?

8 A Yes.

9 Q Now, that wasn't a pinball environment, was it?

10 A I am sorry. I misunderstood.

11 Q I am sorry. It wasn't in an arcade environment, cor-  
12 rect?

13 A No, it wasn't an arcade environment.

14 Q It was in your conference room, correct?

15 A I am sorry. Just to clarify this, we were now  
16 moved around the corner. I was in a back room. We no  
17 longer had a conference room.

18 It was as close as we could simulate to an  
19 arcade as we had two Flickers side by side, which was a  
20 simulation of an arcade environment.

21 Q Fine, and you tested it -- you demonstrated it there?

22 A Yes.

23 Q But you never actually sent Flicker to an arcade?

24 A No.

25 Q You never sent it to a place where people could put

1 coins into it and see if it played?

2 A To the best of my knowledge, no.

3 Q You never put it in a place where it could be sub-  
4 jected to the ingenuity of a 12-year-old?

5 A No -- well, I have to take that back.

6 There were many children that had an oppor-  
7 tunity to play on the machine.

8 Q Not 12-year-olds in gross?

9 A Yes, that is correct.

10 Q With respect to the programming of Flicker, what  
11 about that programming, Mr. Frederiksen; isn't it the case  
12 that Flicker was programmed according to well-known and  
13 standard procedures?

14 A If by that you mean did I follow the instruction  
15 set that was defined in the user's manual, that is correct.

16 Q Isn't it a fact that the programming of Flicker is  
17 within the skill of an ordinary programmer to devise given  
18 the disclosure of Exhibit 3, your patent?

19 A Yes.

20 Q So insofar as the programming of how to program this  
21 game, how to software program the Flicker game, given the  
22 disclosure of your patent, Exhibit 3, the re-issue patent,  
23 that would be within the skill of the ordinary programmer,  
24 is that correct?

25 A Yes.

1 Q And you so testified at your deposition, isn't that  
2 correct?

3 A I don't recall.

4 Q I refer you to page 597. You need only refer to it.

5 You testified at that time that given the  
6 disclosure of your patent, that Flicker could have been  
7 programmed within the skill of an ordinary programmer.

8 MR. TONE: I object to this as not impeaching,  
9 your Honor. I think that is what he just said a minute  
10 ago.

11 MR. LYNCH: Fine.

12 THE COURT: He said he didn't know whether he  
13 had said that at his deposition.

14 MR. TONE: That is true, but --

15 THE COURT: He has said it here, and Mr. Lynch  
16 just asked him if he had said it also in his deposition.

17 It is not impeaching. It is saying the same  
18 thing twice.

19 MR. TONE: All right.

20 BY THE WITNESS:

21 A Yes, it says that.

22 BY MR. LYNCH:

23 Q Now I would like to hand you what has been marked as  
24 Exhibit 2-J.

25 I am sorry, Defendants' Exhibit 2-J.



1                   Exhibit 2-J is material that was prepared at  
2 Dave Nutting Associates at the time of this demonstration  
3 of the Flicker to Bally, isn't that correct?

4       A       Yes.

5       Q       In fact, what is embodied in 2-J was given to those  
6 individuals at that time, is that correct?

7       A       I don't recall. This was something done by Dave  
8 Nutting. It might be best directed at him.

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1 Q Wasn't a proposal made about the Bally Brain at that  
2 time?

3 A Yes.

4 Q And the Bally Brain is the subject matter of the third  
5 page of Exhibit 2-J. Isn't that correct?

6 A Yes. There's a picture of the mother board with the Bally  
7 Brain in it on the third page.

8 Q Now, is that picture -- that picture indicates the Bally  
9 Brian can be used to control pinball, arcade, juke boxes,  
10 vending, guns, and bowling machines, correct?

11 A This picture says "computer playfield, cabinet, upper  
12 cabinet" -- it seems to be referring to a pinball machine.

13 Q I thought I was referring to the third page. I'm sorry.  
14 I meant to indicate the third page.

15 Are you familiar with that document, the third  
16 page of 2-J?

17 A No.

18 Q Now, after the time that Bally came and looked at your  
19 pinball, the Flicker pinball machine, at that time you were  
20 attempting to interest Bally in that very item. Isn't that  
21 correct?

22 A Yes.

23 Q Did Bally respond to that conference in September of  
24 1974 when you tried to sell them the Flicker pinball machine,  
25 or the concept embodied in the Flicker pinball machine?

1 A. I'm not sure what you mean by the term respond.

2 Q. Well, what happened between you and Bally? Did Bally  
3 ever acquire the Flicker machine from you?

4 A. We sent the machine for evaluation. They never purchased  
5 it as a result of that meeting.

6 Q. They didn't undertake to respond to your efforts to  
7 sell them the concept in September of '74. Is that correct?

8 A. Well, again, I'm just confused by the way you're stating  
9 it. I've said --

10 Q. You tried to sell them the machine and the concept in  
11 September of '74.

12 A. That's correct.

13 Q. Was it successful?

14 A. They did not buy the idea from that meeting.

15 Q. They didn't?

16 A. They did not.

17 Q. And in fact, what happened was, they went off and told  
18 you they weren't interested in the idea. Correct?

19 A. That's correct.

20 Q. Now, as a result of that you went and attempted to  
21 interest others in the same idea?

22 A. Yes.

23 Q. Among the others you attempted to interest in that same  
24 idea was a company named Mirco in Phoenix, Arizona. Is that  
25 correct?

Frederiksen - cross

A. Yes.

Q. What was your personal relationship with Mirco?

A. Not too much to the business side. Dave Nutting took care of most of those things.

I designed the machine.

Q. You designed a machine for Mirco, correct?

A. Yes.

Q. What machine did you design?

A. That was the F-8 machine I had spoken about before.

Q. Who designed the playfield?

A. Dave Nutting.

Q. Did it have -- it was -- he designed a brand new playfield?

A. I'm not sure what the source of his idea for the playfield is. You might best ask him that question.

Q. Okay. You substituted a new computer in the device, correct?

A. Yes.

Q. You no longer used the MCS-4.

A. That's correct.

Q. You used the new computer.

A. That's correct.

Q. It was an 8-bit computer, correct?

A. Yes.

Q. It was a faster computer, correct?

1 A. Yes.

2 Q. It eliminated some of the time constraints that you  
3 had with the MCS-4. Isn't that right?

4 A. Which time constraints?

5 Q. Well, if you were worried about coming back and sensing  
6 things frequently enough, this enabled you to process more  
7 information and perform more functions in the same period of  
8 time. Isn't that correct?

9 A. Yes, it did.

10 Q. And there were 8-bit computers in 1974 available, were  
11 there not?

12 A. Yes.

13 Q. They were more expensive, but they were available.

14 A. I'm not sure what was available in 8-bit beyond and 8008.

15 Q. An 8008 and an F-8.

16 A. Was that available in '74? I don't know.

17 Q. '74 when you first developed Flicker?

18 A. The F-8 was -- I don't recall doing anything with the F-8  
19 until 1975. I'm a little confused.

20 Q. Fine. Sometime around there 8-bit microprocessors became  
21 available.

22 A. Yes.

23 Q. And they enable more processing and enable you to do it  
24 more quickly. Correct?

25 p Yes.

Frederiksen - cross

1 Q Now, Mirco in fact came out with a pinball machine,  
2 correct?

3 A Yes.

4 Q They used an 8-bit microprocessor themselves, correct?

5 A Yes.

6 Q That wasn't the F-8 microprocessor.

7 A No, it wasn't.

8 Q It was a 6800 microprocessor.

9 A Yes.

10 Q Do you know if that was available in '74?

11 A I don't know.

12 Q Now, you indicated that you did some experiments on the  
13 Flying Carpet pinball machine back in 1974. Correct?

14 A Yes.

15 Q The Flying Carpet pinball machine was an electromechanical  
16 pinball machine like the Flicker, right?

17 A Yes.

18 Q Was made by Gottlieb?

19 A Yes.

20 Q And is that where you made this -- you ascertained this  
21 fact that the switch closure was 30-millisecnds long?

22 A Yes.

23

24

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1 Q What else did you do with the Flying Carpet other  
2 than determine the length of switch closures?

3 A Most of our studies were dedicated to the switches,  
4 but we did do some solenoid activation measurements to  
5 get an idea of how long they had to stay closed.

6 Q Now, do you have any records of those experiments?

7 A No, I do not.

8 Q Now, you had the Flying Carpet available to you from  
9 late 1973 all the way through June of 1974, isn't that  
10 right?

11 A Yes.

12 Q During that time you were principally working on the  
13 IQ Computer, isn't that correct?

14 A Yes.

15 Q You were not working on pinball, isn't that right?

16 A No.

17 Q You were not principally working on pinball, isn't  
18 that correct?

19 A Yes.

20 Q When you finished the Super IQ Computer, you very  
21 quickly adapted the MCS-4 microprocessor to the pinball  
22 environment, isn't that correct?

23 A Yes.

24 Q How long did it take you?

25 A Well, it did not take too long since it was the same

1 architecture.

2 Q The same architecture?

3 A Yes. It required, of course, the more columns as  
4 we had talked about, which was reversion back to the ori-  
5 ginal number of columns.

6 Q But, of course, the --

7 MR. TONE: Did he finish his answer? Mr. Lynch,  
8 I think you stepped on his answer.

9 May I have the answer read, your Honor?

10 THE COURT: Yes.

11 (Record read by the reporter.)

12 BY MR. LYNCH:

13 Q Anything else?

14 A Yes, as I was saying, that we had architecture back  
15 in the December time frame.

16 Q That is Exhibits 7 and 8?

17 A Yes.

18 Q Now, so it is clear, IQ Computer is not a surface  
19 projectile game?

20 A Yes.

21 Q It is correct that it is not a surface projectile  
22 game?

23 A Yes.

24 Q So, consequently, insofar as your patent and your  
25 invention are concerned, the IQ Computer would clearly not



1 be within the scope of any kind of definition of a device  
2 that was a surface projectile device, right?

3 A No, it would not be in that.

4 Q Now, finally, with respect to the matter of all these  
5 software solutions to noise, do you know if any of those  
6 software solutions to noise appear in the claims of your  
7 patent?

8 A I do not know right now.

9 Q Do you know whether any of the solutions of utilizing  
10 the placing the device in the back cabinet as opposed to  
11 the coffin are in the claims of your patent?

12 A Would you like me to take time to look at this?

13 Q No. Just do you know?

14 A I do not know.

1 Q I take it you do not know whether the distinction  
2 between a mother board/doctor board is within the claims  
3 of your patent?

4 A No.

5 MR. LYNCH: I have no further questions, your  
6 Honor.

7 THE COURT: Mr. Goldenberg.

8 BY MR. GOLDENBERG:

9 Q Mr. Frederiksen, do you have a copy of the re-issue  
10 patent, Plaintiff's Exhibit 3, in front of you?

11 A Yes.

12 Q All right, sir, I would like you to turn your atten-  
13 tion to column 3, line 37. I am sorry. I misspoke, line  
14 53, starting with the phrase, "The several input switches  
15 97."

16 THE COURT: Line what, Mr. Goldenberg?

17 MR. GOLDENBERG: Line 53, column 13.

18 THE COURT: Thank you.

19 THE WITNESS: Yes.

20 BY MR. GOLDENBERG:

21 Q Do you see a reference to a transistor, 88, there?

22 A Yes.

23 Q Could you show me that transistor, 88, in Figure 5 of  
24 the patent?

25 A It is marked with the red circle.

1 Q Are you sure of that, sir?

2 A Yes.

3 Q All right, sir, could you step down to the drawing  
4 and trace the circuit from any one of the two input switches  
5 to the ground as that sentence says there?

6 Could you do that with your finger or  
7 pointer, whichever you are going to feel more comfortable  
8 with?

9 Start down here at the bottom of the drawing,  
10 go up through this column of switches, and we go up to this  
11 junction right here, do we not?

12 A Yes.

13 Q Now, how is that connected to ground through that tran-  
14 sistor, 88?

15 A It would be connected to ground through a transistor  
16 similar to 88 connected on one of the 16 column lines indi-  
17 cated by device 61.

18 Q Show me a transistor connected on one of the 16 column  
19 lines connected to the decoder there, which is 67.

20 A They are not shown here.

21 Q It is not shown on the drawing, is it?

22 A No, sir.

23 Q Now, it is shown and we have identified this -- this is  
24 Defendants' Exhibit 20.

25 Can I have Mr. Harding explain?

1 (A brief off the record discussion.)

2 MR. GOLDENBERG: This is a document produced in  
3 the Bally file and bears their identifying number 392.  
4 We were not sure we were going to have to use it, Judge,  
5 and we had some general category of numbers reserved for  
6 documents of that character.

7 BY MR. GOLDENBERG:

8 Q So this is Defendants' Exhibit 20.

9 Can you tell me what this is, sir?

1 THE COURT: You are saying now Defendants' Exhibit  
2 20 is from Bally's files?

3 MR. GOLDENBERG: It is.

4 THE COURT: All right.

5 MR. RIFKIN: Two oh.

6 MR. GOLDENBERG: Two zero.

7 MR. LYNCH: Two dash oh.

8 MR. GOLDENBERG: Oh, I am sorry. It is not 20.  
9 It is 2-0.

10 MR. LYNCH: 2-0, as in Orville.

11 MR. GOLDENBERG: I thought they were giving me  
12 it in the simplistic way, Judge. They felt I needed it  
13 that way, I thought.

14 MR. KATZ: Are you sure this is 390?

15 MR. GOLDENBERG: It is your document 390.

16 MR. LYNCH: 392.

17 MR. GOLDENBERG: 392.

18 BY MR. GOLDENBERG:

19 Q Can you identify this drawing, sir?

20 A No.

21 Q Have you ever seen it before?

22 A I don't recall seeing this before.

23 MR. TONE: What was the answer, please?

24 BY MR. GOLDENBERG:

25 Q I think your answer was --

1 A I didn't recall seeing this before.

2 MR. LYNCH: Perhaps he saw it in another form  
3 (indicating).

4 BY MR. GOLDENBERG:

5 Q Let me show you an original photocopy in some form  
6 of the document.

7 Does it now seem more familiar to you?

8 Let me put it back up again.

9 A I just don't recognize what it is.

10 Q All right, sir, then I won't proceed any further if  
11 it is not familiar to you.

12 We have another way we can come at it. I  
13 show you a copy of Plaintiff's Exhibit 52, and I direct  
14 your attention to these horizontal lines in the lower  
15 lefthand side and the first group is 16 of them labeled  
16 "mux drive" and what is apparently a transistor configura-  
17 tion on one of the lines.

18 Does this drawing seem familiar to you, sir?

19 Would you like to look at the entire drawing?

20 A Yes, please.

21 (Brief interruption.)

22 BY MR. GOLDENBERG:

23 Q Perhaps to put it in perspective, you may recall in  
24 your direct examination --

25 A Yes, I recall this. This one I recall. This is the

1 Flicker electronics or the Flicker interconnect.

2 Q All right, sir, and directing your attention again  
3 to that lower lefthand corner in what would appear to me  
4 to be an illustration of a particular kind of transistor,  
5 does that correspond to the transistor 88, which is not  
6 illustrated in the patent drawing but which is referred  
7 to in the patent text?

8 A Yes.

9 Q But it was in the device itself but not shown in the  
10 patent drawings; are we agreed on that?

11 A Yes.

12 Q Can we agree, sir, that that is the low beta tran-  
13 sistor that you have been testifying about here?

14 A Yes.

15 Q So actually the low beta transistor that solved this  
16 noise problem doesn't appear in the patent drawing, isn't  
17 that correct?

18 A Yes, at least not in detail.

19 Q It is not there at all, is it?

20 A It shows in the patent a 1-of-16 decoder, and it is  
21 just not detailed as to what the output of that decoder  
22 is driving.

23 Q Well --

24 A Although, I believe it is explained very thoroughly  
25 and generally as to the fact that it is driving something.

1 Q My question, sir, is it is not illustrated in the  
2 patent drawing. There is no transistor connected to any  
3 of these mux lines, is there?

4 A No.

5 Q And that is the low beta transistor 88, isn't it;  
6 that is not shown in the drawing?

7 A It is a low beta transistor that is symbolized simi-  
8 lar to what 88 is.

9 Q All right, sir, I think --

10 A It is not shown.

11 Q -- I have your position.

12 Did I understand -- let me withdraw that.

13 I believe it is your testimony that the  
14 Fireball game sold by Bally in some number incorporated the  
15 invention of this '441 patent, is that correct?

16 A Yes.

17 Q What part of it did it incorporate?

18 MR. TONE: I object to the form of the question  
19 because it assumes it incorporated only part of the inven-  
20 tion, which is not what it --

21 BY MR. GOLDENBERG:

22 Q If it incorporated the entire invention, let me know.

23 A The Fireball pinball machine incorporated the multi-  
24 plexed switches, lamps and digits.

25 Q Did it incorporate in it any of your solutions to the



1 noise problem?

2 A I believe so.

3 Q Which ones?

4 A As far as the software at this time, I can't speak as  
5 familiar as I could with the Flicker since I wrote the  
6 Flicker program personally.

7 By this time, which is sometime later, you  
8 know, there was a programmer that we had hired who did  
9 that programming. That was Jay Fenton.

10 Since some of these solutions are by soft-  
11 ware, I can't speak quite as expertly to those, but as  
12 far as the isolation of electronics into the back panel and  
13 and watching the ground currents, we did those things.

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1 Q That's the physical separation of parts where there  
2 might be noise interference; is that a fair characterization  
3 of what you mean by isolation?

4 A Yes.

5 Q You didn't invent that, did you?

6 A I didn't say that that was the total of what was incor-  
7 porated in that design.

8 I just said that that's the part that I was  
9 responsible for. We had a software programmer that took care  
10 of the software programming.

11 Q But you didn't invent that concept in the sense of being  
12 the first one to ever do that; you didn't do that, did you?

13 A I really don't know. That was my first experience, that  
14 era.

15 Q You had never before encountered a piece of electronic  
16 equipment where parts were separated physically with respect  
17 to each other in order to avoid noise interference?

18 A I had no prior experience.

19 Q I see. So it might have been new as far as you were  
20 concerned.

21 A I couldn't have spoken about that either way.

22 Q All right, sir. Anything else?

23 A In regards to?

24 Q With respect to the things that you conceived of to deal  
25 with the noise problem?

1 A I'm sorry, in conjunction with, now, still the --

2 Q The Fireball game.

3 A The Fireball game?

4 Q Yes.

5 A That's what I recall at this time.

6 Q How about the low beta transistor?

7 I can show you a schematic if that would be  
8 helpful to you.

9 A I do know that we used -- at least I recall we used  
10 Darlington transistors in there as well. I don't recall what  
11 their beta was.

12 It might be helpful to see a schematic.

13 Q This is Plaintiff's Exhibit 402.

14 MR. GOLDENBERG: I understand plaintiff may have a  
15 blow-up of that.

16 (Brief interruption.)

17 BY MR. GOLDENBERG:

18 Q If it would be more helpful to you, sir, there is an  
19 enlargement of that, and you may want to come down and look  
20 at it.

21 A There is a Darlington transistor used here as well, similar  
22 to the Flicker. That's driver A.

23 Q Is that a low beta transistor?

24 A I don't recall right now.

25 Q So you don't know that.

1 A I just don't recall right now.

2 Q All right, sir.

3 Now, do you have any familiarity with the commer-  
4 cial pinball games sold by Bally Manufacturing?

5 A No.

6 Q You have no knowledge of their circuit architecture?

7 A Except for the Fireball, not really.

8 Q Do you know, sir, whether or not they put the switches,  
9 lamps and displays in a single matrix?

10 A I really don't know.

11 Q You don't know.

12 Mr. Frederiksen, I show you a copy of Plain-  
13 tiff's Exhibit 10, which I believe you testified about at your  
14 direct examination.

15 A Yes.

16 Q Could you tell me what that is, sir?

17 A This is a list of parts that, in the upper half, that  
18 Duane wrote down in response to my request to get pricing.  
19 Duane Knudtson, our chief engineer.

er 1 Q How do you know that, sir?

2 A I asked him to do this, and I saw him write the parts  
3 down.

4 Q Did you see him prepare that list?

5 A I saw him write down the part numbers as I gave them to  
6 him.

7 Q I see. And do you recognize his handwriting?

8 A Yes, I do.

9 Q When was that prepared?

10 A This was prepared right after a meeting with Phi Tai  
11 and Bill Levine in conjunction with our first exposure to the  
12 4004 microprocessor.

13 Q That might have been in December of '73?

14 A Yes.

15 Q On the bottom of the document I see a reference to "Bally  
16 Bowling," at least that's the way I read it.

17 Do you read it the same way?

18 A Yes.

19 Q Do you have any idea as to what that means, sir?

20 A No.

21 Q Do you know whether Bally ever made any kind of bowling  
22 game?

23 A Yes.

24 Q Do you know the name of that game?

25 A Bally Alley.

Q Do you know when they made the game?

A. No.

Q Do you know whether or not they made that game before you did your pinball work in '74?

A. I believe it was before.

Q Do you know anything about how that game was controlled?

A. Yes.

Q It was in fact controlled by an Intel microprocessor, was it not?

A. Yes.

Q And it included switches, did it not?

A. Yes.

Q And it included lamps, did it not?

A. Yes.

Q And a scoring display?

A. Yes.

Q And those things were arranged in matrices, were they not?

A. I have no idea.

Q You don't know that.

A. I only played with the machine.

Q Now, I believe it is your testimony that as you entered upon this pinball project, that one of your understandings was that the pinball game was an important game insofar as arcades were concerned. We are talking 1973, '74.

1 A. Yes.

2 Q. Mr. Nutting told you that, did he not?

3 A. Yes.

4 Q. And I believe he told you also that he wanted to get  
5 into the pinball business?

6 A. Yes.

7 Q. And did he also say to you that the only way he could  
8 do that was to have an electronic pinball game?

9 A. Yes.

10 Q. And that was because he had no -- Milwaukee Coin did not  
11 have the manufacturing facilities of Bally, Gottlieb or  
12 Williams. Isn't that true?

13 A. As far as the vertical integration to get the lower cost  
14 relays, that's true.

15 Q. Those companies had all been in that business for a  
16 number of years, had an economic advantage over anyone else  
17 with respect to that kind of game, didn't they?

18 A. Yes.

19 Q. So was it put to you, sir, that it now appeared that the  
20 cost of electronics might now be cheap enough so that an  
21 electronic pinball game could be built?

22 A. Mr. Nutting said that the -- that he only saw that he  
23 could have any hopes of winning through doing electronic  
24 design. That's all he stated. Not quite in the terms you're  
25 stating it.

1 Q But the economics now seemed to indicate that an  
2 economic design was feasible in a competitive basis?

3 A Yes.

4 Q Now, in your own experience working in electronics  
5 and going back, including your military career, can't you  
6 state that the cost of electronic devices had been steadily  
7 dropping for a number of years? Isn't that true?

8 A This was the beginning of my existence in electronics.  
9 I really had very little, if not any prior, experience to  
10 relate anything to at that snapshot in time.

11 Q You had worked for a couple of years for two radio  
12 companies in Milwaukee, is that a correct understanding?

13 A Yes.

14 Q You do not consider that experience in electronics?

15 A I was a technician. I repaired parts with proper  
16 part numbers. I had no idea of the cost of those parts  
17 I was replacing.

18 Q I see. You had never designed a piece of equipment  
19 up until that point in time?

20 A At which point in time?

21 Q Until you joined Milwaukee Coin?

22 A No, that is not true.

23 Q Then tell me what is the fact.

24 A Shortly before then I had designed another device  
25 which I had had called the KC-24. It was a tone encoder



1 for pocket pagers.

2 Q In the course of that work, hadn't you learned some-  
3 thing about the cost of electronic components?

4 A Yes.

5 Q Hadn't you detected a downward trend in their cost?

6 A No.

7 Q No.

8 A It was a very short interval of time.

9 Q I see.

10 Well, as you undertook your work in con-  
11 nection with the Safe game, the Super IQ Computer game,  
12 and later on the pinball game, you were at all times taking  
13 into consideration cost factors, were you not?

14 A Yes.

15 Q Indeed, this is one of the reasons you chose the  
16 single matrix, that you eliminated the necessity for some  
17 individual electronic components for separate matrices,  
18 isn't that true?

19 A Yes.

20 Q So you had an economic constraint imposed on you  
21 during the design you created for the Flicker game, isn't  
22 that true?

23 A Yes.

24 Q Part of what you did was dictated by those economic  
25 constraints?

1 A Yes.

2 Q Now, when you did the conversion to the Flicker game,--  
3 did the conversion of the Flicker game -- I misspoke --  
4 your objective was to emulate the Flicker game and its  
5 electromechanical form, isn't that true?

6 A Yes.

7 Q You succeeded in doing that?

8 A Yes.

9 Q Did you do anything else?

10 A In regards to what?

11 Q Did you improve the game?

12 A I do not recall.

13 Q It played the same way as before, didn't it?

14 A Yes.

15 Q It scored the same way?

16 A Yes, I believe so.

17 Q That was one of your objectives?

18 A Yes.

19 Q So that all that you did in the end was to substitute  
20 one form of control for another form of control, isn't  
21 that true?

22 A Yes.

23 Q Your agreement with Bally, which came along later,  
24 did I understand, sir, that you received stock or Dave  
25 Nutting Associates received stock, and you were a part

1 owner, is that correct?

2 A Yes.

3 Q Did the agreement provide for any other kind of com-  
4 pensation to you?

5 A Yes.

6 Q What other compensation was it?

7 A We had games that we were to develop. We would get  
8 a management incentive.

9 Q What was a management incentive?

10 A It was like a half a percent on the games that we  
11 put into production.

12 Q That would be a kind of royalty? Would you charac-  
13 terize it as that?

14 A I don't think I did. I think I characterized it as  
15 a management incentive.

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1 Q You would get a -- tell me again what the management  
2 incentive was, what its numbers were?

3 A Like a half a percent.

4 Q Half a percent of what, the selling price of the  
5 game?

6 A No, the -- well, Midway's selling price to the --

7 Q Of Midway's selling price?

8 A Right, to the distributors.

9 Q Did you ever receive any management incentives from  
10 Bally?

11 A Yes.

12 Q For pinball games?

13 A I don't recall. I don't think so. If there would  
14 have been any incentives received for a pinball, it might  
15 have been for Fireball, the home game, but I really just  
16 don't recall right now.

17 Q Do you have any way of finding out?

18 A I would imagine Midway should have record of that.

19 Q Don't you?

20 A No.

21 Q I show you documents which have been marked by the  
22 defendants as Exhibits 15-B, -C and -D, and I ask you if  
23 you have ever seen them before?

24 Your Honor, I do have copies for you if  
25 you care to see them.

1 the agreement, and I would like, therefore, to request that  
2 the portion of the transcript dealing with these exhibits  
3 be impounded until I can check or at least not be filed  
4 as part of the court record until I could check with Bally  
5 management to see whether there is any problem.

6 THE COURT: All right. Well, we will grant that  
7 motion and, therefore, the reference to this exhibit in  
8 the transcript and the testimony about it will remain under  
9 seal until further order of the Court.

10 MR. TONE: Thank you.

11 BY MR. GOLDENBERG:

12 Q Mr. Frederiksen, I put on the easel --

13 THE COURT: If you are about to get into a new  
14 subject that will take some time, perhaps this will be a  
15 good point --

16 MR. GOLDENBERG: I think I am, your Honor.

17 THE COURT: -- to recess for the day.

18 All right, we will resume at 9:30 tomorrow  
19 morning.

20 MR. GOLDENBERG: Thank you.

21 THE COURT: You may be excused.

22 (Trial was recessed to Friday, January 6, 1984 at  
23 9:30 a.m.)  
24  
25